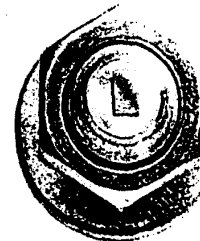
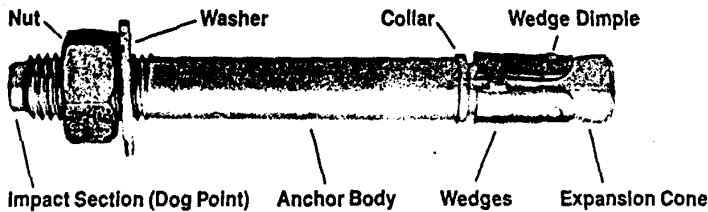


HILTI, INC. - Example #1

# The Hilti Kwik Bolt II

## Product Details



Length Identification

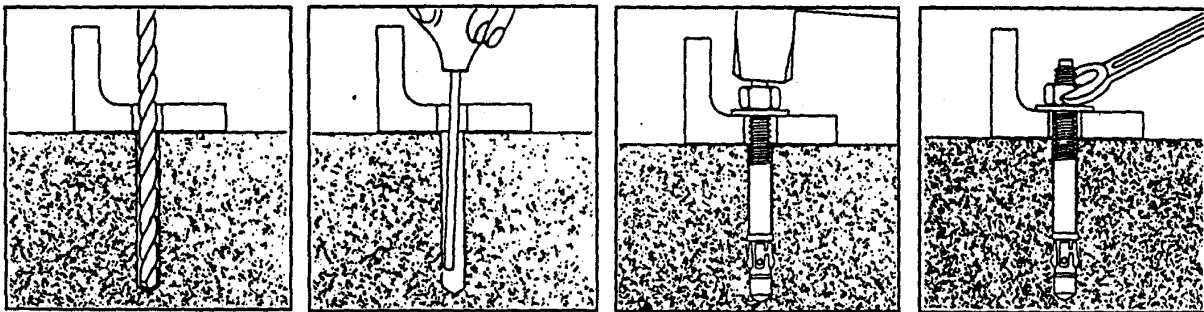
The Kwik Bolt II is a stud type expansion anchor with a single piece wedge that performs as three independent wedges if necessary to ensure consistent performance in a wide variety of medium-duty applications.

## Kwik-Bolt Length Identification System

Stamp on Anchor		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
	From	1½	2	2½	3	3½	4	4½	5	5½	6	6½	7	7½	8	8½	9	9½	10	11	12	13	14	15	16	17	18
Length of Anchor (Inches)	Up To But Not Including	2	2½	3	3½	4	4½	5	5½	6	6½	7	7½	8	8½	9	9½	10	11	12	13	14	15	16	17	18	19

Stamp on Anchor	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
From	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40				
Length of Anchor (Inches)	Up To But Not Including	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41			

## Kwik Bolt II Installation Instructions



1. Simply hammer drill a hole same nominal diameter as Hilti KWIK BOLT-II, with or without the fixture in place — KWIK BOLT-II works in a "bottomless" hole.

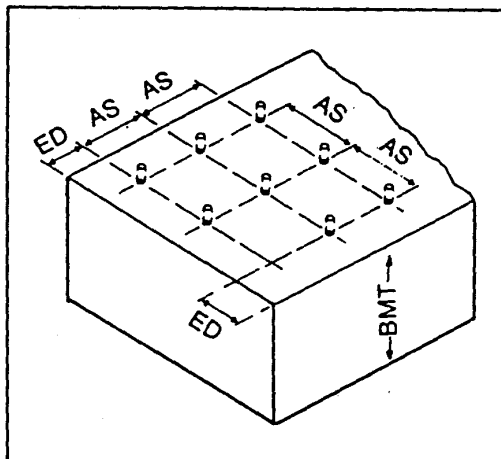
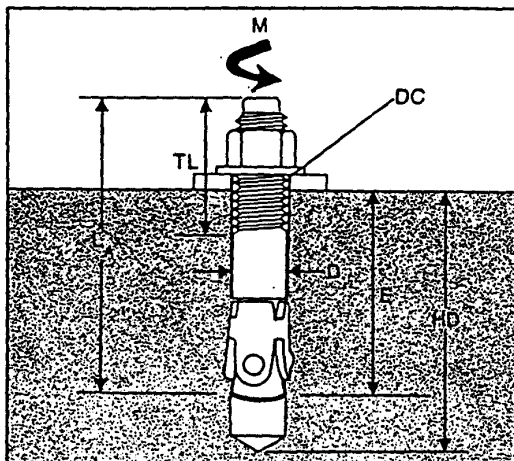
2. Clean hole with Blow Out Bulb.

3. Drive the Hilti KWIK BOLT-II far enough into the hole so that at least six threads are below the top surface of the fixture, using a Hilti 2 lb. hammer.

4. Tighten to the recommended torque value with a torque wrench, or if torque wrench is not available 2 to 3 turns from the finger tight position to achieve proper anchor setting.

HILTI, INC. - Example #2

## Specification Table



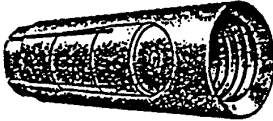
Setting Details				Anchor size											
				HKB 1/4"	HKB 3/8"	HKB 1/2"	HKB 5/8"	HKB 3/4"	HKB 1"						
BD = D	drill bit size = anchor diameter			1/4"	3/8"	1/2"	5/8"	3/4"	1"						
E	depth of embedment (minimum/standard)			1 1/8"/2"	1 5/8"/2 1/2"	2 1/4"/3 1/2"	2 3/4"/4"	3 1/4"/4 3/4"	4 1/2"/6"						
HD	hole depth (E + 1 • D) min./std.			1 3/8/ 2 1/4	2 2 7/8	2 3/4 4	3 3/8/ 4 5/8	4 5 1/2	5 1/2 7						
DC	wedge clearance hole in plate			5/16"	7/16"	9/16"	1 1/16"	1 3/16"	1 1/8"						
L <sub>A</sub>	anchor length min./max.			1 3/4" 4 1/2"	2 1/4" 7"	2 3/4" 7"	3 3/4" 10"	4 1/4" 12"	6" 12"						
TL	thread length std./extra thread length			3/4" 3"	7/8"/1 1/8" 4"	1 1/4" 4"	1 1/2" 3 1/2"/4 1/2"	1 1/2" 3 1/2"/4 1/2"	2 1/4" 4 1/2"						
M	Installation torque (ft. lb.) guide valves	Stainless Steel	min. E	4	20	40	85	150	235						
			std. E	7	30	75	110	200	450						
		Carbon Steel	min. E	4	20	40	85	150	250						
			std. E	7	25	65	110	235	450						
BMT	Min. Base Material Thickness (inches)			3" or 1.3 E whichever number is greater											
DIAMETER (in.)				1/4	3/8	1/2	5/8	3/4	1						
EMBEDMENT (in.) minimum/standard				1 1/8	2	1 5/8	2 1/2	2 1/4	3 1/2	2 3/4	4	3 1/4	4 3/4	4 1/2	6
AS	Spacing Required to Obtain Maximum Working Load			2 1/4	4	3 1/4	5	4 1/2	7	5 1/2	8	6 1/2	9 1/2	9	12
AS <sub>min</sub>	Minimum Allowable Spacing Between Anchors (in.) Refer to Note #1.			1 1/8	2	1 5/8	2 1/2	2 1/4	3 1/2	2 3/4	4	3 1/4	4 3/4	4 1/2	6
ED	Edge Distance Required To Obtain Maximum Working Load (in.)		Shear	3 3/8	3 3/8	4 7/8	4 7/8	6 3/4	6 3/4	8 1/4	8 1/4	9 3/4	9 3/4	13 1/2	13 1/2
			Tension	1 3/4	3	2 1/2	3 3/4	3 3/8	5 1/4	4 1/8	6	4 7/8	7 1/8	6 3/4	9
ED <sub>min</sub>	Minimum Allowable Edge Distance (in.) Refer to Note #2 & 3		Shear	1 3/4	1 3/4	2 1/2	2 1/2	3 3/8	3 3/8	4 1/8	4 1/8	4 7/8	4 7/8	6 3/4	6 3/4
			Tension	1 1/8	2	1 5/8	2 1/2	2 1/4	3 1/2	2 3/4	4	3 1/4	4 3/4	4 1/2	6

NOTE: 1. When using AS<sub>min</sub> reduce the working load by 30%.  
2. When using ED<sub>min</sub> and the load is a shear load, reduce the working load by 50%.  
3. When using ED<sub>min</sub> and the load is a tensile load, reduce the working load by 20%.  
4. For AS and ED of anchors with actual embedments between the listed embedments, use linear interpolation.  
5. For AS and ED of anchors with embedments greater than the deepest embedment listed, use value for deepest embedment listed.

HILTI, INC. - Example #3

## The Hilti Drop-In Anchor

### Product Details



### Advantages:

Shallow embedment depth

Internal thread

Anchor is flush with base material

Internal plug

### Material

Anchor material is SAE 1110M for the 1/4", 3/8" and 1/2" HDI's.

Anchor material is AISI 12L14 steel, meeting ASTM specification A 108 for 3/8" & 1/2" HDI's.

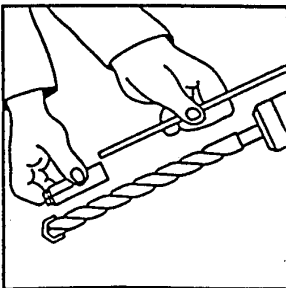
Anchor material is AISI 303 for stainless steel anchors.

Plated with dull zinc finish for corrosion protection in accordance with ASTM B633, Sc. 1, Type III.

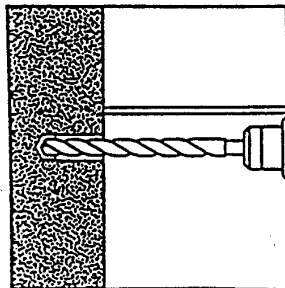
### Specification Table

Details		Anchor Size				
D	bolt size	1/4"	3/8"	1/2"	5/8"	3/4"
BD	bit diameter	3/8"	1/2"	5/8"	27/32"	1"
E	rec. min. depth of embedment	1"	1 1/8"	2"	2 1/8"	3 1/8"
L	anchor length					
HD	hole depth					

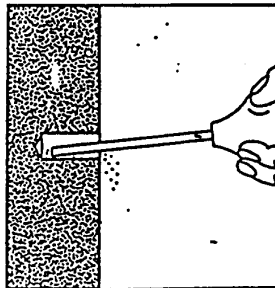
### Setting Instructions



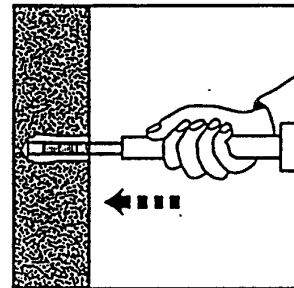
1. Adjust depth gauge



2. Hammer drill hole



3. Clean hole



4. Install anchor using proper setting tool. Setting tool to be driven into anchor until setting tool shoulder meets top of anchor.

HILTI, INC. - Example #4



### 4.3.1

## Anchoring Systems HVA Adhesive System

#### 4.3.1.1 PRODUCT DESCRIPTION

The Hilti HVA system is a heavy duty, two component adhesive anchor consisting of a self-contained adhesive capsule and either a threaded rod with nut and washer or an internally threaded insert.

##### Product Features

- High loading capacity
- Does not exert expansion pressure on base materials
- Close edge distance allowance
- Tight anchor spacing allowance
- Excellent performance in matched tolerance diamond-cored holes
- Excellent elevated temperature performance
- Excellent performance in freezing and thawing conditions
- Seismic tested per ICBO AC508, ASTM E-1512

##### Guide Specifications

**Masterformat section:** 03250 (Concrete accessories)  
**Related Sections:** 03200 (Concrete Reinforcing-Reinforcing Accessories)  
05050 (Metal Fabrication)  
05120 (Structural Steel)

Adhesive anchors shall consist of an all-thread anchor rod, nut, washer and adhesive capsule. Alternatively, adhesive anchors shall consist of a steel insert and an adhesive capsule.

**Anchor Rod**—Shall be provided with 45 degree chisel point to provide proper mixing of the adhesive components. Anchor rod shall be manufactured to meet the following requirements: 1. ASTM A36 (standard carbon steel anchor) 2. ASTM A193 Grade B7 (Type 2) 3. AISI 304 or AISI 316 stainless steel meeting the mechanical requirements of ASTM F-593 (Condition CW).

**Nuts and Washers**—Shall be furnished to meet the requirements of the above anchor rod specifications.



HVU Adhesive Capsule



HAS Anchor Rod Assembly with nut and washer



HIS Internally Threaded Insert



Rebar (Not supplied by Hilti)

**Adhesive Capsule**—Shall consist of a dual chamber foil capsule. The resin material shall be vinyl urethane.

**Steel Insert**—The internally threaded insert shall be manufactured with a 45 degree (from central axis) chisel-pointed end. The insert shall be manufactured from carbon steel or stainless steel material which meets minimum ultimate tensile strengths of 71 and 74 ksi respectively.

The adhesive anchoring system shall be the Hilti HVA anchoring system, consisting of the Hilti HVU adhesive capsule and the Hilti HAS anchor rod or HIS internally threaded insert.

**Installation**—Adhesive anchors to be installed in holes drilled using the specified diameter of Hilti carbide-tipped drill bit or matched tolerance DCI core bit. Anchors shall be installed in strict accordance to section 4.3.1.4. Anchors shall not be disturbed until cure time has elapsed.

#### Listings/Approvals

- International Conference of Building Officials (ICBO): Evaluation Report pending
- Southern Building Code Congress International (SBCCI): Report pending
- City of Los Angeles (COLA): Research Report pending
- Metro-Date Acceptance No. pending

#### 4.3.1.2 MATERIAL SPECIFICATIONS

	MECHANICAL PROPERTIES	
	$f_u$ ksi (MPa)	min. $f_u$ ksi (MPa)
Standard HAS rod material meets the requirements of ASTM A36	36 (248)	58 (400)
High Strength or 'Super HAS' rod material meets the requirements of ASTM A193, Grade B7	105 (724)	125 (862)
Stainless HAS rod material meets the requirements of ASTM F593 (AISI 304) Condition CW 3/8" - 5/8"	65 (448)	100 (689)
Stainless HAS rod material meets the requirements of ASTM F593 (AISI 304) Condition CW 3/4" - 1 1/4"	45 (310)	85 (586)
HIS Insert 9SMNPB36K Carbon Steel Conforming to DIN 1651	56 (390)	71 (490)
HIS-R Insert X5CrNiMo17122 K700 Stainless Steel Conforming to DIN 17440	35 (241)	74 (510)
HAS Standard Nut material meets the requirements of ASTM A563, Grade A		
HAS Super Nut material meets the requirements of ASTM A563, Grade DH		
HAS Stainless Steel Nut material meets the requirements of ASTM F594		
HAS Standard Washer meets dimensional requirements of ANSI B18.22.1 Type A Plain		
HAS Super Washer meets the requirements of ASTM F436		
HAS Stainless Steel Washer meets dimensional requirements of ANSI B18.22.1 Type A Plain		
All standard HAS & HAS Super Rods (except 7/8"), HIS inserts, nuts & washers are zinc plated to ASTM B633 SC1		
7/8" HAS rods hot-dip galvanized in accordance with ASTM A153		
HVU Adhesive—Vinyl Urethane Resin with a Dibenzoyl Peroxide hardener		

**Note:** Special Order HAS rods, nuts and washers may vary from standard materials.

HILTI, INC. - Example #5

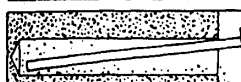
## Anchoring Systems



## HVA Adhesive System

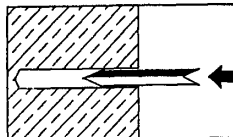
4.3.1

### 4.3.1.4 INSTALLATION INSTRUCTIONS—HAS ROD AND HIS INSERT



1. Set the drill depth gauge and drill a hole to the required hole depth.

**IMPORTANT:** Clean out dust and debris. Use compressed air or vacuum at bottom of the hole. When using a matched tolerance diamond core bit, flush hole with water from the bottom of the hole and allow concrete to dry.

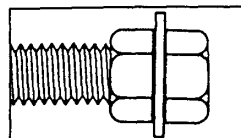


2. Insert appropriate diameter HVU adhesive capsule\* into pre-drilled hole in base material.

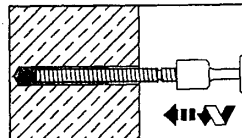
**NOTE:** The best method for setting multiple capsules is to crush the first capsule(s) into the hole and then insert the next capsule. DO NOT cut off capsules partially protruding from the hole.

\*Capsule length is longer than standard embed. depth and will protrude from the hole.

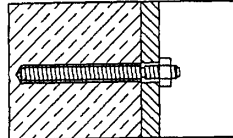
#### HAS Threaded Rods



3. Thread a nut on the HAS rod. Place a washer on top of the first nut and then thread a second nut down on top of the washer. Tighten the two nuts together "locking" the washer between them. The top nut should be flush with the top of the rod.

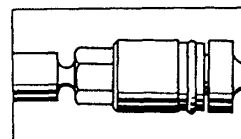


4. Insert a square drive shaft into the hammer drill and attach the proper impact socket. At the rotary hammer drill setting, engage the top nut of the HAS rod assembly with the socket and drive the rod down to the embedment mark.

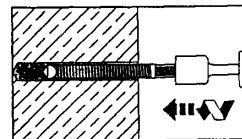


5. The set anchor rod may not be disturbed or loaded before the specified curing time elapses.

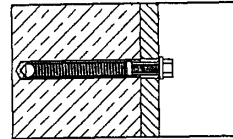
#### HIS Internally Threaded Insert



3. Insert the shaft with socket into the hammer drill, screw the setting tool into the HIS and place in the socket.

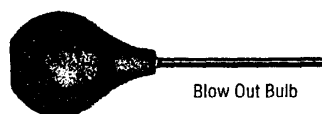


4. At the rotary hammer drill setting, drive the HIS until flush with the surface of the concrete.

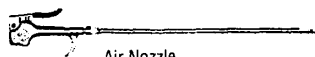


5. The set anchor can not be disturbed or loaded before the specified curing time elapses.

### 4.3.1.5 ORDERING INFORMATION



Blow Out Bulb



Air Nozzle

Description	Item No.	Use
Blow Out Bulb BB	00060503	For all hole sizes
Air Nozzle (Length 12") 3/8" THD	00089314	For all hole sizes
Air Nozzle (Length 24") 3/8" THD	00063964	For all hole sizes

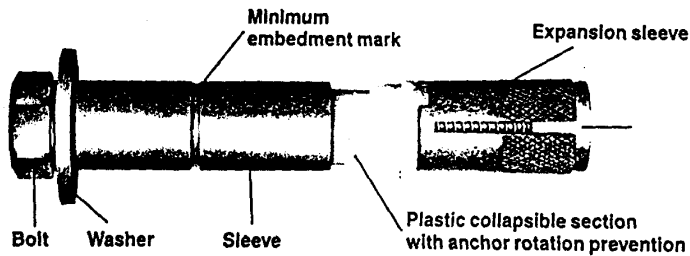
HILTI, INC. - Example #6

# HSL Metric Heavy-Duty Expansion Anchor

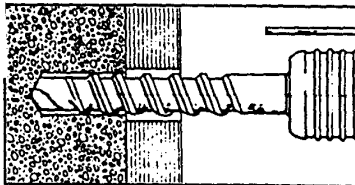
Reliable heavy-duty anchor for heavy/dynamic loads

## Product Details

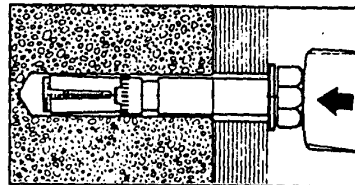
### Hilti HSL Heavy-Duty Anchor



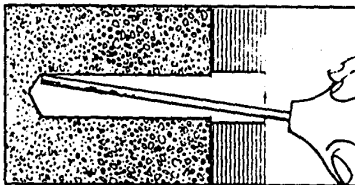
## HSL Metric Installation Instructions



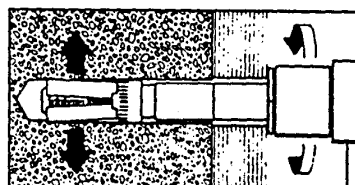
1. Drill a hole with the prescribed Hilti metric bit. Note: the HSL can be installed in a bottomless hole.



3. Using a hammer, tap the preassembled anchor through the object being anchored into the hole. The anchor should be seated firmly against the base plate. Note: do not expand the anchor by hand before tapping it into the hole.



2. Clean the hole using a blow-out bulb or compressed air.

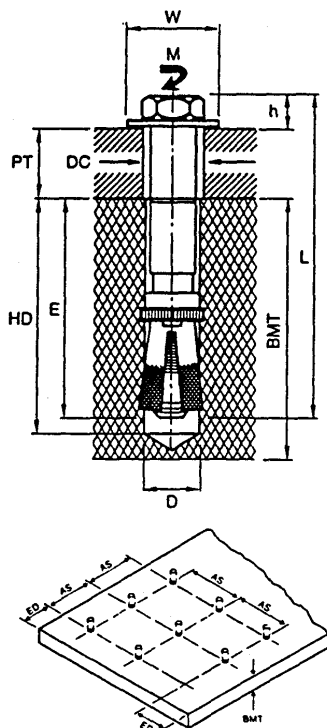


4. Tighten bolt or nut to the specified torque, using a torque wrench.

Note: When using an HSLB anchor no torque wrench is required. The torque cap shears off at the specified torque value.

HILTI, INC. - Example #7

**HSL Metric Specification Table**



Notes:

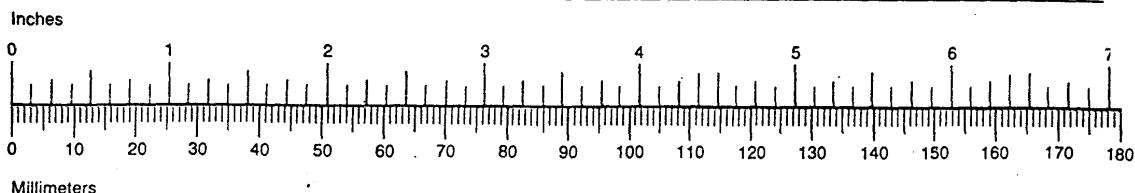
1. When using  $AS_{min}$  reduce the working load by 30%
2. When using  $ED_{min}$  and the load is a shear load, reduce the working load by 70%
3. When using  $ED_{min}$  and the load is a tensile load, reduce the working load by 30%
4. To convert mm's to inches divide by 25.4

Setting details		Thread size											
		M8/20	M8/40	M10/20	M10/40	M12/25	M12/50	M16/25	M16/50	M20/30	M20/60	M24/30	M24/60
D (mm)	drill bit dia.	12	15	18	24	28	32						
HD (mm)	hole depth	75	85	100	125	150	175						
E (mm)	min. depth of embedment	65	75	80	105	130	155						
AS	spacing required to obtain maximum working load (mm)	195	225	240	315	390	465						
AS min	Minimum allowable spacing between anchors (mm) Refer to note 1	65	75	80	105	130	155						
ED	Edge distance required to obtain maximum working load (mm)	162	187	200	262	325	387						
ED min	Minimum allowable edge distance (mm) Refer to notes 2 and 3	65	75	80	105	130	155						
PT (mm)	max. thickness fastened	20	40	20	40	25	50	25	50	30	60	30	60
L (mm)	anchor length	95	115	107	127	120	145	148	173	183	213	205	235
h (mm)	head height + washer	7.5	10	11	14	17	19						
M (ft.-lbs.)	max. tightening torque	20	40	60	150	300	525						
Max. gap (mm)		4	5	8	9	12	16						
Wrench Size (mm)	HSL/HSLG	13	17	19	24	30	36						
	HSLB	—	—	24	30	36	41						
DC (mm)	clearance hole	14-15	17-18	20-21	26-28	31-33	35-37						
W (mm)	washer dia.	20	25	30	40	45	50						
BMT (mm)	min. base material thickness	120	140	160	180	220	270						
Drill bit		TE-C12/20 TE-F-12/34	TE-C-15/25 TE-F-15/34	TE-C-18/20 TE-F-18/34	TE-C-24/25 TE-F-24/32	TE-F-28/37	TE-F-32/37						
Hammer Drill		TE10, TE12S, TE22, TE52, TE72	TE10, TE12S, TE22, TE52, TE72	TE10, TE12S, TE22, TE52, TE72, TE92	TE22, TE52, TE72, TE92	TE52, TE72, TE92	TE52, TE72, TE92						

The HSL Metric Anchor Spacings and Edge Distances are Calculated Using the Following Information:

	Anchor Spacing			Edge Distance Shear Load Only			Edge Distance Tension Load Only		
	AS	$AS_{min}$	$f_{AS}$	ED	$ED_{min}$	$f_{ED}$	ED	$ED_{min}$	$f_{ED}$
HSL	3.0E	1.0E	0.7	2.5E <sub>min</sub>	1.0E <sub>min</sub>	0.3	2.5E	1.0E	0.7

**Metric Ruler**



ITW RAMSET/RED HEAD ANCHORS - Example #1



MADE  
IN  
U.S.A.

ITW Ramset/Red Head



**TRUBOLT** WEDGE

**DEPENDABLE, HEAVY DUTY, INSPECTABLE,  
WEDGE TYPE EXPANSION ANCHOR**

- Versatile fully threaded design is standard on sizes up to  $\frac{3}{4}$ " diameter and 7" length.
- Anchor diameter equals hole diameter.
- One piece stainless steel expander clip resists corrosion.
- 360° contact with concrete assures full expansion for reliable working loads.
- Non bottom-bearing, may be used in hole depth exceeding anchor length.
- Supplied complete with nut and washer.
- Can be installed through the work fixture, eliminating hole spotting.
- Inspectable torque values, indicating proper installation.
- Heavy duty pull-out and shear capacities.

**MODELS/VARIATIONS**

**Zinc-plated Carbon Steel**—standard anchor for all structural and in-plant uses. Zinc-plated in accordance with Federal specification QQ-Z-325C Type II, Class 3.

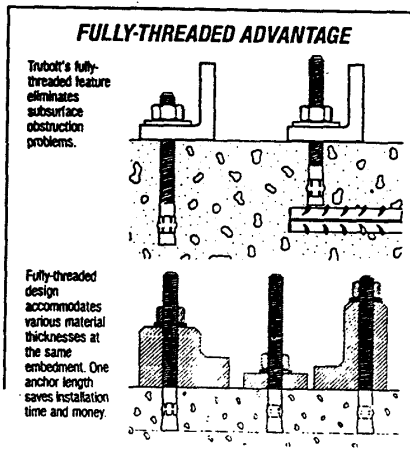
**Galvanized Steel**—provides protection from mildly humid, corrosive or brine atmospheres. Outdoor applications include fencing, gates, handrails, docks, conveyors, highway guard rails, signs, lighting and safety devices. Galvanized in accordance with ASTM A153 Class C. (Nuts and washers are also hot dipped galvanized.)

**Stainless Steel**—for protection in humid, highly corrosive and acidic environments. Used extensively in architecture to mount aluminum and stainless steel window frames and curtain walls. Bolt body 302HQ, 303, or 316 stainless steel. Type 302HQ stainless steel exhibits the same corrosion resistance as Type 304 stainless. It meets ASTM A276 and A479 specifications.

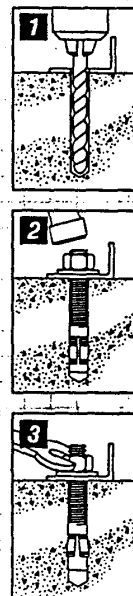
**APPROVALS/LISTINGS**

Meets or exceeds U.S. Government G.S.A.  
Specification FF-S-325 Group II, Type 4, Class I.

- Underwriters Laboratories.
- Factory Mutual.
- ICBO Evaluation Service, Inc. Report #1372.
- City of Los Angeles, Report #RR2748.
- Metro Dade County Florida.
- SBCCI Compliance Report #9053.
- California State Fire Marshal.



**INSTALLATION STEPS**



1. Using a bit whose diameter equals the anchor diameter, drill hole to any depth exceeding minimum embedment. Clean hole.
2. Assemble anchor with nut and washer so that the top of the nut is flush with the top of the anchor. Drive anchor through material to be fastened so that nut and washer is flush with surface of material.
3. Expand anchor by tightening nut 3 to 5 turns, or to the specified torque requirement. (see selection chart)

See Installation Cautions on Back Page.



ITW RAMSET/RED HEAD ANCHORS - Example #2

Carbon Steel		Galvanized Steel		302HQ/303** Stainless Steel		316 Stainless Steel		Anchor Diameter & Drill Bit Size/Threads Per Inch	A Overall Length	B Max. Thickness of Material to be Fastened	D Min. Embedment in Concrete	Installation Torque (Ft. Lbs.)
Catalog Number	C Thread Length	Catalog Number	C Thread Length	Catalog Number	C Thread Length	Catalog Number	C Thread Length					
WS-1416* WS-1422* WS-1432*	3/4" 1-1/4" 2-1/4"			WW-1416* WW-1422* WW-1432*	3/4" 1-1/4" 2-1/4"	SWW-1416 SWW-1422	3/4" 3/4"	1/4"/20	1-3/4" 2-1/4" 3-1/4"	3/8" 7/8" 1-7/8"	1-1/8"	8
♦WS-3822* ♦WS-3826* ♦WS-3830* ♦WS-3836* ♦WS-3850*	1-1/8" 1-5/8" 1-7/8" 2-5/8" 2-1/2"			♦WW-3822* ♦WW-3826* ♦WW-3830* ♦WW-3836* ♦WW-3850*	1-1/8" 1-5/8" 1-7/8" 2-5/8" 2-1/2"	♦SWW-3826 ♦SWW-3830 ♦SWW-3836	1-1/8" 1-1/8" 1-1/8"	3/8"/16	2-1/4" 2-3/4" 3" 3-3/4" 5"	3/8" 7/8" 1-1/8" 1-7/8" 3-1/8"	1-1/2"	25
♦WS-1226* ♦WS-1236* ♦WS-1242* ♦WS-1254* ♦WS-1270*	1-1/4" 2-1/4" 2-3/4" 3" 4-1/2"	♦WS-1226G* ♦WS-1242G* ♦WS-1254G* ♦WS-1270G*	1-1/4" 2-3/4" 3" 4-1/2"	♦WW-1226* ♦WW-1236* ♦WW-1242* ♦WW-1254* ♦WW-1270*	1-1/4" 2-1/4" 2-3/4" 3" 4-1/2"	♦SWW-1226 ♦SWW-1236 ♦SWW-1242 ♦SWW-1254	1-5/16" 1-5/16" 1-5/16" 1-5/16"	1/2"/13	2-3/4" 3-3/4" 4-1/4" 5-1/2" 7"	1/8" 1" 1-1/2" 2-3/4" 4-1/4"	2-1/4"	55
♦WS-5834* ♦WS-5842* ♦WS-5850* ♦WS-5860* ♦WS-5870* ♦WS-5884* ♦WS-58100	1-3/4" 2-1/2" 3-1/4" 3-1/2" 4-1/2" 1-3/4" 1-3/4"	♦WS-5834G* ♦WS-5860G*	1-3/4" 3-1/2"	♦WW-5834* ♦WW-5850* ♦WW-5860* ♦WW-5870* ♦WW-5884	1-3/4" 3-1/4" 3-1/2" 4-1/2" 1-3/4"	♦SWW-5850 ♦SWW-5884	1-3/4" 1-3/4"	5/8"/11	3-1/2" 4-1/4" 5" 6" 7" 8-1/2" 10"	1/8" 7/8" 1-5/8" 2-5/8" 3-5/8" 5-1/8" 6-5/8"	2-3/4"	90
♦WS-3442* ♦WS-3446* ♦WS-3454* ♦WS-3462* ♦WS-3470* ♦WS-3484* ♦WS-34100 ♦WS-34120	1-3/4" 2-1/4" 3" 3-3/4" 4-1/2" 1-3/4" 1-3/4" 1-3/4"	♦WS-3446G* ♦WS-3454G*	2-1/4" 3"	♦WW-3446* ♦WW-3454* ♦WW-3470* ♦WW-3484* ♦WW-34100	2-1/4" 3" 4-1/2" 1-3/4" 1-3/4"	♦SWW-3446 ♦SWW-3454	1-3/4" 1-3/4"	3/4"/10	4-1/4" 4-3/4" 5-1/2" 6-1/4" 7" 8-1/2" 10" 12"	1/4" 3/4" 1-1/2" 2-1/4" 3" 4-1/2" 6" 8"	3-1/4"	175
WS-7880 WS-7880 WS-78100	2-1/2" 2-1/2" 2-1/2"			WW-7880	2-1/2"			7/8"/9	6" 8" 10"	1-3/8" 3-3/8" 5-3/8"	3-3/4"	250
†WS-10060 †WS-10090 †WS-100120	2-1/2" 2-1/2" 2-1/2"	†WS-10090G	2-1/2"	WW-10060 WW-10090	2-1/2" 2-1/2"			1"/8	6" 9" 12"	1/2" 3-1/2" 6-1/2"	4-1/2"	300
†WS-12590 †WS-125120	3-1/2" 3-1/2"							1-1/4"/7	9" 12"	2-1/4" 5-1/4"	5-1/2"	500
Tie Wire TWS-1400	N/A							1/4"	2-3/16"	Eye Dia. 9/32"	1-1/8"	N/A

\*Fully Threaded

1 Performance data also available for concrete strengths from 2500 to 5500 PSI, and lightweight aggregate concrete from 4000 to 6000 PSI.

† Carbon steel anchor sizes through 7/8" in diameter have stainless steel expansion clips. Larger diameter carbon steel and galvanized anchors have carbon steel expansion clips. All size stainless steel anchors have stainless steel expansion clips. † Denotes carbon steel clip.


‡ Ultimate load capacity in 4,000 PSI stone aggregate concrete. Ultimate pullout and shear loads are indicated for the depth of embedment in concrete shown in the "Embedment in Concrete" column. Based on independent Testing Laboratory tests.

1-1/4" diameter carbon steel anchors were tested at a depth of 10-1/2" for tensile capacities, and 10" for shear. 1" diameter stainless steel anchors were tested at a depth of 10-1/2" for tensile capacities, and 10-1/4" for shear. Safe working loads for single installations under static loading should not exceed 25% of the ultimate load capacity. For information on other conditions, contact your nearest factory representative.

For load capacities in structural lightweight aggregate concrete, refer to ICBO Report #1372 or contact Technical Service Department.

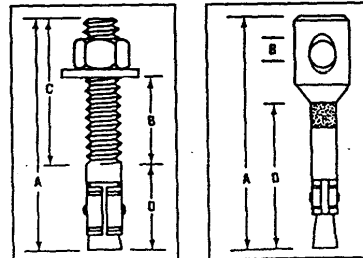
For extreme low temperature applications, use stainless steel anchors.

NOTE: Capacities shown in Selection Chart are based on most recent testing performed in compliance with ASTM E-488 and ICBO Research Committee Standards for Testing Expansion Anchors in Concrete.

♦ Indicates  Approval.

• Indicates  Listing.

\*\* "WW" anchor body material may be Type 303 or Type 302HQ according to metal forming efficiency. Type 302HQ meets corrosion resistant properties of Type 303 and 304.



ITW RAMSET/RED HEAD ANCHORS - Example #3



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ITW Ramset/Red Head



**DYNABOLT SLEEVE**

**VERSATILE, HEAVY-DUTY SLEEVE ANCHOR**

- Anchor diameter equals hole diameter.
- Available in hex head and 6 other head styles.
- Provides full 360° hole contact over large area and reduces concrete stress.
- Heavy-loading capacity.
- Preassembled for faster, easier installations.
- Dynabolt can be installed through object to be fastened.
- Six rib sleeve design improves holding power.
- No pre-spotting of holes necessary.

**MODELS/VARIATIONS**

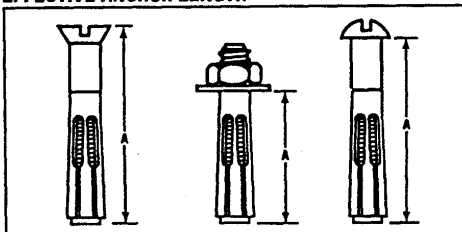
**Carbon Steel**—Sleeve anchors are available in sizes from ¼" to ¾", and in lengths from 1½" to 6¼". Head styles available are acorn nut, hex nut, flat head, threshold flat head, round head, tie wire and hex coupling. Zinc plated in accordance with Fed. Spec. QQ-Z-325C Type II, Class 3.

**Stainless Steel**—for protection in humid or corrosive environments, stainless hex head, flat head and round head sleeve anchors are available.

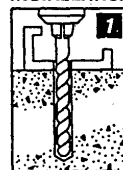
**SELECTION CHART**

Head Style	Carbon Steel	Stainless Steel	Anchor Diameter & Drill Bit Size	A Effective Anchor Length	Bolt Diameter/Threads Per Inch	Min. Embedment	Max. Thickness Of Material To Be Fastened	4000 PSI	4000 PSI
	Catalog Number	Catalog Number						Ultimate Pullout* Lbs.	Ultimate Shear* Lbs.
	HN-1405	SHN-1413	1/4"	5/8"	3/16"/24	1/2"	1/8"	500	1751
	HN-1413		1/4"	1-3/8"	3/16"/24	1-1/8"	1/4"	1613	1751
	HN-1422		1/4"	2-1/4"	3/16"/24	1-1/8"	1-1/8"	1613	1751
	HN-1614		5/16"	1-1/2"	1/4"/20	1-1/4"	1/4"	2429	2487
	HN-1624		5/16"	2-1/2"	1/4"/20	1-1/4"	1-1/4"	2429	2487
	HN-3817	SHN-3817	3/8"	1-7/8"	5/16"/18	1-1/2"	3/8"	2597	2872
	HN-3830	SHN-3830	3/8"	3"	5/16"/18	1-1/2"	1-1/2"	2597	2872
	◆HN-1222	◆SHN-1222	1/2"	2-1/4"	3/8"/16	1-7/8"	3/8"	5385	5582
	◆HN-1230	◆SHN-1240	1/2"	3"	3/8"/16	1-7/8"	1-1/8"	5385	5582
	◆HN-1240		1/2"	4"	3/8"/16	1-7/8"	2-1/8"	5385	5582
	◆HN-5822		5/8"	2-1/4"	1/2"/13	2"	1/4"	5708	7435
	◆HN-5830		5/8"	3"	1/2"/13	2"	1"	5708	7435
	◆HN-5842		5/8"	4-1/4"	1/2"/13	2"	2-1/4"	5708	7435
	◆HN-5860	◆SHN-5842	5/8"	6"	1/2"/13	2"	4"	5708	7435
	◆HN-3424		3/4"	2-1/2"	5/8"/11	2-1/4"	1/4"	6470	13071
	◆HN-3440		3/4"	4"	5/8"/11	2-1/4"	1-3/4"	6470	13071
	◆HN-3462		3/4"	6-1/4"	5/8"/11	2-1/4"	4"	6470	13071

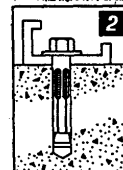
**EFFECTIVE ANCHOR LENGTH**



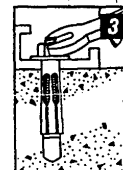
**INSTALLATION STEPS**



1. Use a bit whose diameter is equal to the anchor. See Selection Chart to determine proper size bit for anchor used. Drill hole to any depth exceeding minimum embedment. Clean hole.



2. Insert assembled anchor into hole, so that washer or head is flush with materials to be fastened.



3. Expand anchor by tightening nut or head 2 to 3 turns.

See Installation Cautions on Back Page.

ITW RAMSET/RED HEAD ANCHORS - Example #4

ITW Ramset/Red Head



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# MULTI-SET II DROP-IN

## INTERNALLY THREADED, HEAVY-DUTY, STEEL EXPANSION DROP-IN ANCHOR

- Flange-topped, non-bottom bearing anchor.
- Fast, easy installation.
- Multi-Set II anchor can be installed flush or recessed in a hole of any depth.
- Four-way slot assures dependable, uniform anchor expansion.
- Pre-assembled plug cannot fall out in shipment, or during installation.

- Anchor body installs quickly and reduces concrete unit stress.
- Layout and hole-spotting necessary for accurate installation.

### MODELS/VARIATIONS

**Carbon Steel**—Multi-Set II Anchors are available in sizes 1/4" through 3/4". Zinc plated in accordance with Fed. Spec. QQ-Z-325C Type II, Class 3.

**Stainless Steel**—for protection in humid or corrosive environments, available in sizes 1/4" through 3/4".

### SELECTION CHART

Carbon Steel Cat. No.	303 Stainless Steel Cat. No.	Bolt Size/Threads Per Inch	Drill Bit Size	A Thread Depth	B Min. Hole Depth	Ultimate Pullout* Lbs.	Ultimate Shear* Lbs.	Setting Tool Cat. No. 2
RM-14	SRM-14	1/4"/20	3/8"	3/8"	1"	3,204	1,986	RT-114
♦RM-38	♦SRM-38	3/8"/16	1/2"	1/2"	1-5/8"	6,350	3,968	RT-138
♦RM-12	♦SRM-12	1/2"/13	5/8"	3/4"	2"	8,544	6,502	RT-112
♦RM-58	♦SRM-58	5/8"/11	7/8"	1"	2-1/2"	15,218	10,380	RT-158
♦RM-34		3/4"/10	1"	1-1/4"	3-3/16"	17,255	13,962	RT-134

\*Performance data also available for lightweight aggregate concrete from 4000 to 6000 PSI.

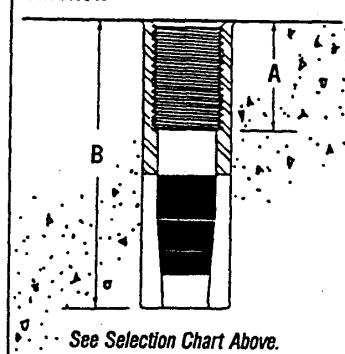
†Use only Ramset/Red Head setting tools to insure proper installation.  
\*Ultimate load capacity in 4310 PSI 3/4 inch crushed limestone aggregate concrete. Capacities are for carbon steel versions. Based on independent Testing Laboratory tests. Copies of reports are available on request.

For load capacities in structural lightweight aggregate concrete refer to ICBO Report No. 1372 or contact Technical Service Dept.  
Safe working loads for single installations under static loading should not exceed 25% of the ultimate load capacity. For information on other conditions, contact your nearest factory representative.

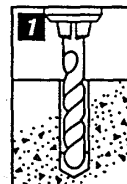
♦ Indicates Approval. • Indicates Listing.

For additional Approvals/Lists see Selector Guide (page 2).

## INTERNALLY THREADED, HEAVY DUTY, STEEL EXPANSION DROP-IN ANCHOR

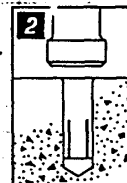


### INSTALLATION STEPS

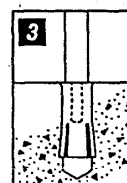


To set anchor flush with surface.

1. Drill hole the same diameter as anchor being used to any depth exceeding minimum embedment. Clean hole.



2. Drive anchor flush with surface of concrete.



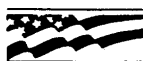
3. Expand anchor with setting tool provided. Anchor is properly expanded when shoulder of setting tool is flush with top of anchor.

To set anchor below surface.

1a. Drill hole deeper than anchor length. Thread bolt into anchor. Hammer anchor into hole until bolt head is at desired depth. Remove bolt and set anchor with setting tool.

See Installation Cautions on Back Page.

# ITW RAMSET/RED HEAD ANCHORS - Example #5



**ITW Ramset/Red Head**

## SELF-DRILL

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### HEAVY-DUTY ANCHOR THAT DRILLS ITS OWN HOLE

- Anchor expands by driving anchor over the plug.
- Hole diameter and depth are assured.
- Dependable, powerful holding capacity.
- Self-drilling action produces accurate hole size, every time.
- Fast, easy installation.
- Eliminates use of carbide bits by drilling its own hole.
- Perfect for dependable overhead applications.

### MODELS

Self-drilling anchors are available in snap-off design, sizes 1/4" through 3/4" for floor, wall and ceiling installation with rotary/stop hammer. Zinc plated in accordance with Fed. Spec. QQ-Z-325C Type II, Class 3. Meets or exceeds U.S. Government G.S.A. Specification FF-S-325 Group III, Type 1.

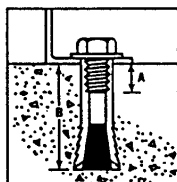
### VARIATIONS

Self-drilling anchors are available with oversize internal threads to accept galvanized bolts. (Special order.)

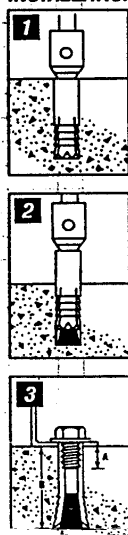
### SELECTION CHART

Cat. No.	Bolt Size/Threads Per Inch	A Thread Depth	B Depth In Concrete	Outside Dia.	Ultimate <sup>1</sup> Pullout <sup>2</sup> Lbs.	Ultimate <sup>1</sup> Shear <sup>3</sup> Lbs.
S-14	1/4"/20	3/8"	1-3/32"	7/16"	2,713	2,103
♦S-38	3/8"/16	9/16"	1-17/32"	9/16"	4,200	4,550
♦S-12	1/2"/13	13/16"	2-1/32"	11/16"	7,350	6,800
♦S-58	5/8"/11	15/16"	2-15/32"	27/32"	10,250	9,900
♦S-34	3/4"/10	1-7/32"	3-1/4"	1"	13,950	12,350

<sup>1</sup>Performance data also available for concrete strengths from 2000 to 4000 PSI and lightweight aggregate concrete from 4000 to 6000 PSI.  
<sup>2</sup>Ultimate load capacity in 4713 PSI 3/4" inch crushed limestone aggregate concrete. Based on Independent Testing Laboratory tests.  
<sup>3</sup>For load capacities in structural lightweight aggregate concrete refer to ICBO Report No. 1372 or contact Technical Service Dept.  
Safe working loads for single installations under static loading should not exceed 25% of the ultimate load capacity. For information on other conditions, contact your nearest factory representative.  
♦ Indicates Approval. • Indicates Listing.  
For additional Approvals/Listings see Selector Guide (page 2).



### INSTALLATION STEPS



1. Using the anchor as the drill bit, drill hole until chuck holder is flush with surface of concrete. Remove anchor from hole and clean out anchor and hole.
2. Insert red plug in anchor. Expand anchor by reinserting it into hole and driving it in until chuck holder is flush with the surface of the concrete. Snap-off cone.
3. Bolt the object to complete the installation.

See Installation Callouts on Back Page.

### CHUCK SHANKS (with Drift Pins)

Catalog Number	Chuck Used	Shank Type
SS-47	RH Chuck Head	Spline

### SELF-DRILL CHUCK HEADS

Catalog Number	Shank Used Spline	Anchor Size
RH-514	SS-47	1/4"
RH-538	SS-47	3/8"
RH-512	SS-47	1/2"
RH-558	SS-47	5/8"
RH-534	SS-47	3/4"

# ITW RAMSET/RED HEAD ANCHORS - Example #6

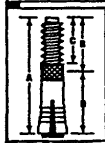


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## BOTTOM BEARING, EXTERNAL THREAD EXPANSION ANCHOR

- Fast and easy to install.
- Drill bit size equals anchor diameter.
- Hammer-driven for dependable load capacity.
- Anchor can be installed through object to be fastened, no hole spotting is necessary.
- Each Stud Anchor is pre-assembled.
- Bottom-bearing design is ideal for jacking and leveling.

Catalog Number	Hole & Drill Bit Size/Threads Per Inch	A Overall Length	B Stud Length	C Thread Length	D Min. Embedment	Ultimate <sup>1</sup> Pullout* Lbs.	Ultimate <sup>1</sup> Shear** Lbs.
JS-14C JS-14H JS-14M	1/4"/20	1-3/4" 2-1/4" 3-1/4"	3/4" 1-1/8" 2-1/8"	5/8" 7/8" 7/8"	1-3/8"	1,909	2,186
•JS-38C •JS-38H •JS-38M	3/8"/16	2-1/4" 3" 3-3/4"	1" 1-5/8" 2-1/4"	3/4" 1-1/4" 1-1/4"	1-5/8"	2,327	4,575
•JS-12C •JS-12H •JS-12M	1/2"/13	2-3/4" 4-1/4" 5-1/4"	1-1/8" 2-1/2" 3-5/8"	7/8" 2" 2"	1-7/8"	5,826	6,524
•JS-58C •JS-58H •JS-58M	5/8"/11	3-3/8" 5" 7"	1-3/8" 3" 5"	1-3/8" 2-1/4" 2-1/4"	2-3/8"	7,705	11,199
•JS-34C •JS-34H •JS-34M	3/4"/10	4-1/4" 6-1/4" 8-1/2"	1-3/4" 3-3/4" 6"	1-3/8" 2-1/2" 2-1/2"	2-7/8"	9,597	15,276

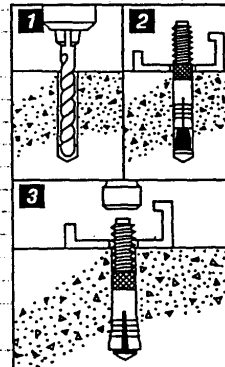


<sup>1</sup>Performance data also available for concrete strengths from 2000 to 4000 PSI, and lightweight aggregate concrete from 4000 to 6000 PSI.  
\*Ultimate load capacity in 4090 PSI 3/4 inch crushed limestone aggregate concrete. Based on independent Testing Laboratory tests. For load capacities in structural lightweight aggregate concrete refer to ICBO Report No. 1372 or contact Technical Service Dept. Safe working loads for single installations under static loading should not exceed 25% of the ultimate load capacity. For information on other conditions, contact your nearest factory representative.  
• Indicates Approval. • Indicates Listing.  
For additional Approvals/Listings see Selector Guide (page 2).

ITW Ramset/Red Head

## STUD ANCHOR

### INSTALLATION STEPS



1. Drill hole same diameter as anchor to embedment specified in chart. Clean hole.
2. Drive anchor with red plug in bottom, through material to be fastened.
3. Expand anchor by driving anchor over plug with hammer.

See Installation Cautions on Back Page.

## Non-Drill

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## HEAVY-DUTY, INTERNAL THREAD EXPANSION ANCHOR

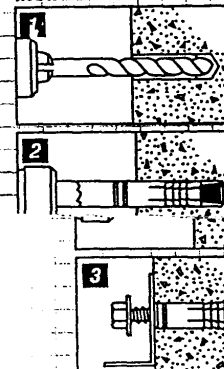
- Anchor expands by driving the anchor over the plug.
- Vibration and shock resistant.
- Perfect for flush installations.
- Bottom-bearing design for immediate loading.
- Anchor is hammer-driven.

Cat. No.	Bolt Size/Threads Per Inch	Anchor Diameter (Drill Size)	Thread Depth	Min. Hole Depth	Ultimate <sup>1</sup> Pullout* (Lbs.)	Ultimate <sup>1</sup> Shear** (Lbs.)	Setting Tool Cat. No.
J-14	1/4"/20	7/16"	3/8"	1-1/8"	3,850	7,373	JD-14
•J-38	3/8"/16	9/16"	15/32"	1-9/16"	3,978	7,373	JD-38
•J-12	1/2"/13	11/16"	23/32"	2-1/16"	7,549	8,863	JD-12
•J-58	5/8"/11	27/32"	7/8"	2-9/16"	10,847	13,618	JD-58
•J-34	3/4"/10	1"	1-1/8"	3-3/16"	12,260	18,282	JD-34

<sup>1</sup>Performance data also available for concrete strengths from 2000 to 4000 PSI.  
\*Ultimate load capacity in 4090 PSI 3/4 inch crushed limestone aggregate concrete. Based on independent Testing Laboratory tests. For load capacities in structural lightweight aggregate concrete refer to ICBO Report No. 1372 or contact Technical Service Dept. Safe working loads for single installations under static loading should not exceed 25% of the ultimate load capacity. For information on other conditions, contact your nearest factory representative.

\*\*Shear tests were conducted in 3802 PSI concrete.  
• Indicates Approval. • Indicates Listing.

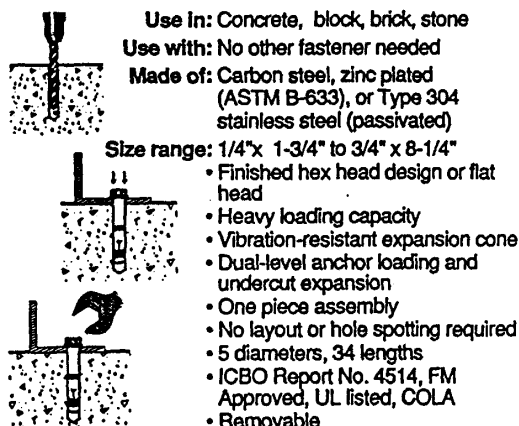
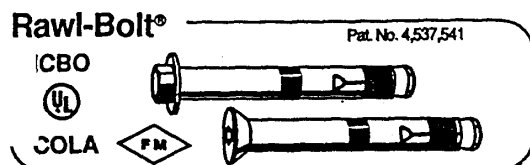
### INSTALLATION STEPS



1. Drill hole to anchor diameter and embedment specified in the chart. Clean hole.
2. Place red plug snug in anchor. Drip in hole and expand anchor with a few blows of hammer on setting tool until flush or slightly below flush with the surface.
3. Insert bolt and secure item being installed.

See Installation Cautions on Back Page.

# THE RAWL COMPANY, INC. - Example #1



**Remove inspection tag. Do not expand before installation. Position fixture, drill hole. Insert Rawl-Bolt and drive flush with fixture. Tighten to recommended torque.**

The Rawl-Bolt is a single-unit, vibration-resistant, removable anchor bolt assembly with a finished hex or flat head design. As the anchor size is hole size, the Rawl-Bolt eliminates layout or hole-spotting. As the anchor is driven into the hole, the slotted, over-sized annular ring on the bottom of the cone is compressed until it mates perfectly with the hole. This action prevents the anchor from spinning while it is being tightened.

Expansion occurs at two levels within the drilled hole. First, the cone is pulled into the large triple-tined expansion sleeve, developing a mid-level, load bearing capacity over a large surface area. Further turning causes the threaded bolt to advance into the threads at the compressed end of the cone, forcing the four sections of the cone outward, driving them into the base material. This action develops a lower level undercut load-bearing capacity deep in the hole over a the full 360° area, greatly increasing the holding power of the anchor and reducing the tendency of the concrete to spall under heavy loading.

As the bolt enters the compressed threaded area of the cone, tremendous lateral forces are created between the concrete and the mating male and female threads, which keeps them locked together preventing loosening under even the most severe vibratory conditions.

The Rawl-Bolt is designed to draw the work tighter to the surface because of its unique, flexible, compression ring. As the anchor is being tightened, the nylon compression ring will compress so that the material being fastened is tightly pressed against the face of the base material.

## STAINLESS STEEL HEX HEAD RAWL-BOLT®

Stainless steel Rawl-Bolt Anchors are manufactured from Type 304 stainless steel.

Cat. No.	Size	Drill Dia.	Min. Depth	Std. Box	Std. Ctn.	Wt./ 100
5910	3/8" x 2-1/4"	3/8"	2"	50	300	10
5914	3/8" x 3-1/2"	3/8"	2"	50	300	12
5916	3/8" x 4"	3/8"	2"	50	300	14
5930	1/2" x 2-3/4"	1/2"	2-1/2"	50	200	16
5934	1/2" x 4-3/4"	1/2"	2-1/2"	25	150	26
5944	5/8" x 5"	5/8"	2-3/4"	15	90	47
5946	5/8" x 7"	5/8"	2-3/4"	15	60	67
5954	3/4" x 5-1/4"	3/4"	3"	15	60	70
5957	3/4" x 8-1/4"	3/4"	3"	10	40	110

The published length is measured from below the washer to the end of the anchor.

## CARBON STEEL FLAT HEAD RAWL-BOLT®

The flat head Rawl-Bolt has a hex key insert formed in the head of the bolt. Each box contains an allen wrench which matches the insert size.

6981	3/8" x 4"	3/8"	2"	50	300	14
6982	3/8" x 5"	3/8"	2"	50	300	17
6983	3/8" x 6"	3/8"	2"	50	300	20
6984	1/2" x 4-3/4"	1/2"	2-1/2"	25	150	26
6987	5/8" x 6"	5/8"	2-3/4"	15	90	57

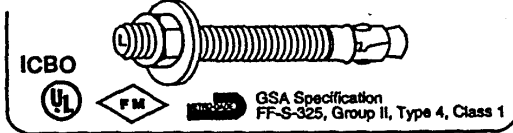
## FIXTURE CLEARANCE HOLES

Since the Rawl-Bolt Anchor is designed to be driven through the fixture, the following table lists the minimum recommended clearance hole to be provided in the fixture. The clearance hole should be adjusted to allow for any coating applied to the fixture

Anchor Size	1/4"	3/8"	1/2"	5/8"	3/4"
Clearance Hole	5/16"	7/16"	9/16"	11/16"	13/16"

THE RAWL COMPANY, INC. - Example #2

**Rawl-Stud**



Use in: Concrete, stone

Use with: No other fastener needed

Made of: Carbon steel or stainless steel

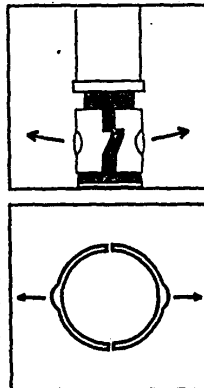
Size range: 1/4" x 1-3/4" to 1-1/4" x 12"

- No layout or hole spotting required
- Patented inter-locking wedges
- FM approved, UL listed, ICBO Report No. 4514, Metro-Dade
- 89 diameters and lengths, other sizes on special order
- Also stocked in mechanically galvanized carbon steel, types 303 and 316 stainless steel

Position fixture, drill hole. Drive Rawl-Stud into hole until nut and washer are flush with fixture, and tighten.

The Rawl-Stud is a one-piece anchor available in carbon steel or stainless steel for installation in highly corrosive environments.

The patented dual inter-locking expansion wedges provide optimum performance. During installation of the Rawl-Stud, the inter-locking tabs on the wedges grip the anchor body firmly to prevent spinning of the anchor during the tightening process. As the anchor is tightened, the wedges distribute the compression load equally in lateral planes to prevent cocking of the anchor or premature failure of the concrete due to uneven distribution of the load.



The Rawl-Stud is available with a length identification mark stamped on the head of the anchor as shown below.

Mark	A	B	C	D	E	F	G	H
From	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5
Up to But Not Including	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2

Mark	I	J	K	L	M	N	O	P
From	5 1/2	6	6 1/2	7	7 1/2	8	8 1/2	9
Up to But Not Including	6	6 1/2	7	7 1/2	8	8 1/2	9	9 1/2

Mark	Q	R	S	T	U	V	W	X	Y	Z
From	9 1/2	10	11	12	13	14	15	16	17	18
Up to But Not Including	10	11	12	13	14	15	16	17	18	19

**STAINLESS STEEL RAWL-STUD**

Stainless Steel Rawl-Stud anchors are manufactured from AISI Type 303 and Type 316 steel (passivated). Additional sizes and corrosion resistant materials are available on a special order basis.

**TYPE 303 STAINLESS STEEL RAWL-STUD**

Cat. No.	Size	Min. Depth	Thread Length	Std. Box	Std. Ctn.	Wt./ 100
7300	1/4" x 1-3/4"	1-1/8"	3/4"	100	500	3
7302	1/4" x 2-1/4"	1-1/8"	1-1/4"	100	500	3-1/2
7304	1/4" x 3"	1-1/8"	2"	100	500	4-3/4
7310	3/8" x 2-1/4"	1-3/4"	1"	50	250	8-3/4
7312	3/8" x 2-3/4"	1-3/4"	1-1/2"	50	250	9-1/2
7313	3/8" x 3"	1-3/4"	1-3/4"	50	250	10-3/4
7314	3/8" x 3-1/2"	1-3/4"	2-1/4"	50	250	12
7315	3/8" x 3-3/4"	1-3/4"	2-1/2"	50	250	12-3/4
7316	3/8" x 5"	1-3/4"	3-3/4"	50	250	15-1/2
7320	1/2" x 2-3/4"	2-1/4"	1-1/4"	50	200	18
7322	1/2" x 3-3/4"	2-1/4"	2-1/4"	50	200	23
7323	1/2" x 4-1/2"	2-1/4"	3"	50	200	30
7324	1/2" x 5-1/2"	2-1/4"	4"	50	150	34
7326	1/2" x 7"	2-1/4"	5-1/2"	25	100	44
7330	5/8" x 3-1/2"	2-7/8"	1-7/8"	25	100	40
7332	5/8" x 4-1/2"	2-7/8"	2-7/8"	25	100	54
7333	5/8" x 5"	2-7/8"	3-3/8"	25	100	57
7334	5/8" x 6"	2-7/8"	4-3/8"	25	25	64
7336	5/8" x 7"	2-7/8"	5-3/8"	25	25	72
7338	5/8" x 8-1/2"	2-7/8"	1-5/8"	25	25	84
7340	3/4" x 4-1/4"	3-3/8"	2-1/4"	20	20	70
7341	3/4" x 4-3/4"	3-3/8"	2-3/4"	20	20	76
7342	3/4" x 5-1/2"	3-3/8"	3-1/2"	20	20	85
7344	3/4" x 6-1/4"	3-3/8"	4-1/4"	20	20	95
7346	3/4" x 7"	3-3/8"	1-3/4"	20	20	105
7348	3/4" x 8-1/2"	3-3/8"	1-3/4"	10	10	120
7349	3/4" x 10"	3-3/8"	1-3/4"	10	10	135
7361	1" x 6"	4-1/2"	2-3/8"	10	10	170
7363	1" x 9"	4-1/2"	2-3/8"	10	10	240
7365	1" x 12"	4-1/2"	2-3/8"	10	10	300

**TYPE 316 STAINLESS STEEL RAWL-STUD**

7610	3/8" x 2-1/4"	1-3/4"	1"	50	250	8-3/4
7612	3/8" x 2-3/4"	1-3/4"	1-1/2"	50	250	10-1/2
7614	3/8" x 3-1/2"	1-3/4"	2-1/4"	50	250	12-1/2
7615	3/8" x 3-3/4"	1-3/4"	2-1/2"	50	250	13
7616	3/8" x 5"	1-3/4"	3-3/4"	50	250	17-1/4
7620	1/2" x 2-3/4"	2-1/4"	1-1/4"	50	200	18
7622	1/2" x 3-3/4"	2-1/4"	2-1/4"	50	200	24
7624	1/2" x 5-1/2"	2-1/4"	4"	50	150	34
7626	1/2" x 7"	2-1/4"	5-1/2"	25	100	44
7630	5/8" x 3-1/2"	2-7/8"	1-7/8"	25	100	40
7632	5/8" x 4-1/2"	2-7/8"	2-7/8"	25	100	54
7634	5/8" x 6"	2-7/8"	4-3/8"	25	25	64
7638	5/8" x 8-1/2"	2-7/8"	6-7/8"	25	25	84
7640	3/4" x 4-1/4"	3-3/8"	2-1/4"	20	20	70
7642	3/4" x 5-1/2"	3-3/8"	3-1/2"	20	20	85
7646	3/4" x 7"	3-3/8"	5"	20	20	105
7648	3/4" x 8-1/2"	3-3/8"	1-3/4"	10	10	120

The published length is the overall length of the anchor. Allow one anchor diameter for the nut and washer thickness when selecting a length.

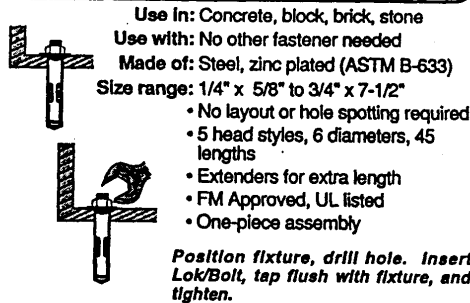
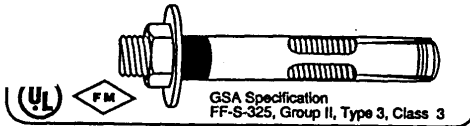
**FIXTURE CLEARANCE HOLES FOR RAWL-STUD**

For installations where the Rawl-Stud will be driven through the fixture, the following table lists the minimum recommended clearance hole to be provided in the fixture. The clearance holes should be adjusted to allow for any coating applied to the fixture

Anchor Size	1/4"	3/8"	1/2"	5/8"	3/4"	7/8"	1"	1-1/4"
Clearance Hole	5/16"	7/16"	9/16"	11/16"	13/16"	15/16"	1-1/8"	1-3/8"

THE RAWL COMPANY, INC. - Example #3

**Rawl Lok/Bolt™**



**Use In:** Concrete, block, brick, stone  
**Use with:** No other fastener needed  
**Made of:** Steel, zinc plated (ASTM B-633)  
**Size range:** 1/4" x 5/8" to 3/4" x 7-1/2"  
• No layout or hole spotting required  
• 5 head styles, 6 diameters, 45 lengths  
• Extenders for extra length  
• FM Approved, UL listed  
• One-piece assembly

**Position fixture, drill hole. Insert Lok/Bolt, tap flush with fixture, and tighten.**

The Rawl Lok/Bolt is designed to draw the fixture tighter to the surface because of its unique, flexible, compression ring. As the anchor is being tightened, the nylon compression ring will compress, if necessary, so that the material being fastened is tightly secured against the face of the base material. Under load, the specially tapered bolt is drawn further into the expansion sleeve to develop increased locking action against the walls of the hole.

The all-steel, multi-purpose anchor bolt is intended for use in a wide range of concrete and masonry materials. Installation is fast and easy. Drill a hole of the same diameter as Lok/Bolt, with fixture in place. Insert the Lok/Bolt, tap hole until flush with fixture and tighten with wrench or screwdriver to the recommended torque.

Cat. No.	Size	Drill Dia.	Min. Depth	Std. Box	Std. Ctn.	Wt./ 100
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**HEX NUT**

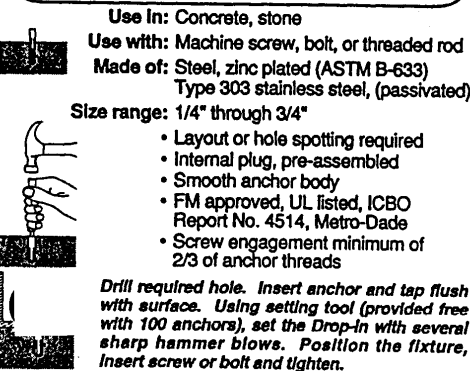
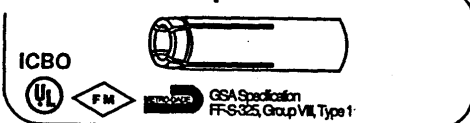
5005	5/16" x 1-1/2"	5/16"	1-3/8"	100	1000	4-1/4
5010	5/16" x 2-1/2"	5/16"	1-1/2"	100	500	5-3/4
5015	3/8" x 1-7/8"	3/8"	1-5/8"	50	500	7
5020	3/8" x 3"	3/8"	1-5/8"	50	500	10
5022	3/8" x 4"	3/8"	1-5/8"	50	250	16
5025	1/2" x 2-1/4"	1/2"	2-1/8"	25	250	14
5030	1/2" x 3"	1/2"	2-1/4"	25	250	17-1/4
5034	1/2" x 4"	1/2"	2-1/4"	25	125	22
5033	1/2" x 5-1/4"	1/2"	2-1/4"	25	125	27
5032	1/2" x 6"	1/2"	2-1/4"	25	125	35
5035	5/8" x 2-1/4"	5/8"	2-1/8"	25	125	25-1/2
5038	5/8" x 3"	5/8"	2-3/4"	25	125	34
5040	5/8" x 4-1/4"	5/8"	2-3/4"	10	100	41
5045	5/8" x 6"	5/8"	2-3/4"	10	100	49
5050	3/4" x 2-1/2"	3/4"	2-1/8"	10	100	46
5055	3/4" x 4"	3/4"	3-3/8"	10	10	70
5060	3/4" x 5-3/4"	3/4"	3-3/8"	10	10	90
5065	3/4" x 7-1/2"	3/4"	3-3/8"	10	10	115

**MULTIPLE USE KIT**

5660	1/2"	1/2"	2-1/4"	25	250	10
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The published length is measured from below the washer to the end of the anchor.

**Rawl Steel Drop-In**



**Use In:** Concrete, stone  
**Use with:** Machine screw, bolt, or threaded rod  
**Made of:** Steel, zinc plated (ASTM B-633)  
Type 303 stainless steel, (passivated)  
**Size range:** 1/4" through 3/4"  
• Layout or hole spotting required  
• Internal plug, pre-assembled  
• Smooth anchor body  
• FM approved, UL listed, ICBO Report No. 4514, Metro-Dade  
• Screw engagement minimum of 2/3 of anchor threads

**Drill required hole. Insert anchor and tap flush with surface. Using setting tool (provided free with 100 anchors), set the Drop-In with several sharp hammer blows. Position the fixture, insert screw or bolt and tighten.**

The Rawl Steel Drop-In is an all-steel, machine bolt anchor with a pre-assembled internal expander plug. This anchor design offers fast and easy installation and provides maximum holding power. It can be installed flush with the base material surface or submerse.

**STEEL DROP-IN ( INTERNAL PLUG)**

Cat. No.	Size	Drill Dia.	Min. Depth	Thread Depth	Std. Box	Std. Ctn.	Wt./ 100
6304	1/4"	3/8"	1-1/4"	7/16"	100	1000	2
6306	3/8"	1/2"	1-7/8"	5/8"	50	500	6
6308	1/2"	5/8"	2-3/8"	13/16"	50	250	12
6320	5/8"	7/8"	3"	1-3/16"	25	125	32
6312	3/4"	1"	3-1/2"	1-3/8"	10	50	48

**STAINLESS STEEL DROP-IN ( INTERNAL PLUG)**

6204	1/4"	3/8"	1-1/4"	7/16"	100	1000	2
6206	3/8"	1/2"	1-7/8"	5/8"	50	500	6
6208	1/2"	5/8"	2-3/8"	13/16"	50	250	12
6220	5/8"	7/8"	3"	1-3/16"	25	125	32
6212	3/4"	1"	3-1/2"	1-3/8"	10	50	48

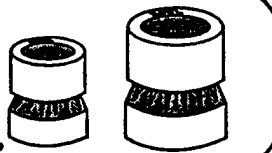
One setting tool included with 100 anchors.



THE RAWL COMPANY, INC. - Example #4

## Rawl Multi-Calk

GSA Specification  
FF-S-325, Group I, Type 1, Class 2

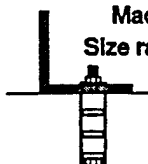


**Use In:** Concrete, brick, stone

**Use with:** Machine screw or bolt

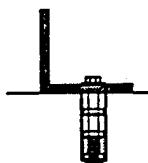
**Made of:** Lead and Zamac 7 alloy

**Size range:** 1/2" to 1"



- Layout or hole-spotting required
- Heavy Duty
- Threaded and plain style
- Screw engagement minimum of 2/3 of anchor threads

**Stud Installation - Place bolt head in hole. Drop plain unit (cone end first) over bolt. Calk with tool until firmly set. Repeat for each successive unit. Position fixture. Thread on nut and tighten.**



**Threaded installation - Assemble threaded unit onto threaded rod. Insert assembly into hole, cone end first. Calk with tool until firmly set. Add additional plain unit(s), calking each individually. Remove rod. Position fixture. Insert screw or bolt and tighten.**

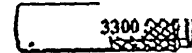
The Rawl Multi-Calk is a multiple-unit machine bolt anchor designed for the heavy duty loads.

Cat. No. Plain	Size	Drill Dia.	Std. Box	Std. Ctn.	Wt./ 100
9120	1/2"	1"	50	250	10
9125	5/8"	1-1/8"	50	250	14
9130	3/4"	1-3/8"	25	125	22
9135	7/8"	1-1/2"	25	25	32
9140	1"	1-5/8"	25	25	37

Cat. No. Thread	Size	Drill Dia.	Std. Box	Std. Ctn.	Wt./ 100
9170	1/2"	1"	50	250	15
9175	5/8"	1-1/8"	50	250	20
9180	3/4"	1-3/8"	25	125	35
9185	7/8"	1-1/2"	25	25	44
9190	1"	1-5/8"	25	25	54

STAR EXPANSION COMPANY - Example #1

## DROP-GRIP® ANCHOR



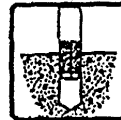
### Specifications:

Drop-Grip® Size	Drop-Grip® Length	Drill Bit Diameter	Drop-Grip® Thread Length	Bolt Diameter	Pullout Test 15,000 P.S.I. CONCRETE Tensile
1/4"	1"	3/8"	7/16"	1/4"	2,300 lbs
3/8"	1-9/16"	1/2"	5/8"	3/8"	4,100 lbs
1/2"	2"	5/8"	1-3/16"	1/2"	6,000 lbs
5/8"	2-1/2"	7/8"	1-3/16"	5/8"	8,300 lbs
3/4"	3-3/16"	1"	1-3/16"	3/4"	13,600 lbs
Suggested safe working load is one-fourth (1/4) of the average proof test load.					

Note: All weight and load conditions described or referenced in this material were determined under laboratory conditions. Material and installation conditions vary in the field. To determine your holding factors, test product in actual conditions and material.

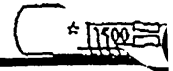
### Installation:

1. Drill hole to a depth at least equal to the length of the anchor.
2. Clean out hole of all dust and cuttings.
3. Insert anchor, knurled end first, and tap flush with surface.
4. Using a STAR Drop-In Setting Tool, set anchor with several solid hammer blows.
5. Position fixture over hole. Insert screw or bolt through fixture and tighten.



STAR EXPANSION COMPANY - Example #2

# STEEL ANCHORS



## Specifications:

Steel Anchor Size	Steel Anchor Length	Steel Anchor Thread Depth	Drill Bit Diameter	Bolt Diameter	Pullout Test in 4000 P.S.I. concrete	
					Tensile	Shear
1/4"	1-3/32"	3/8"	7/16"	1/4"	2,080 lbs	1,960 lbs
3/8"	1-17/32"	9/16"	9/16"	3/8"	2,560 lbs	4,400 lbs
1/2"	2-1/32"	13/16"	11/16"	1/2"	4,440 lbs	6,400 lbs
5/8"	2-15/32"	15/16"	27/32"	5/8"	6,280 lbs	9,720 lbs
3/4"	3-1/2"	1-7/32"	1"	3/4"	9,640 lbs	17,680 lbs

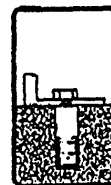
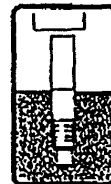
Suggested Safe Working Loads: 1/4 of the average maximum proof test loads.

Note: All weights and load conditions described or referenced in this material were determined under laboratory conditions. Material and installation conditions vary in the field. To determine your holding factors, test product in actual conditions and materials.

## Installation:

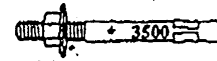
The Star Steel Anchor can be set flush or at varying depths for additional holding power. If set flush, an installation tool is not needed. Anchor can be set by applying hammer blows directly to the shield. The shield is expanded and anchored in place without the assistance of the object to be fastened. Objects bolted to this anchorage can be removed and/or replaced.

1. Drill hole of recommended diameter and depth into the concrete.
2. Clean out hole of all dust and cuttings.
3. Preassemble the expander plug, small end first, into the bore of the slotted end of the anchor. Tap lightly on the plug to ensure that it will not fall out of the anchor when putting it in the hole.
4. Place the Steel Anchor, expander plug first, into the hole.
5. Put the tapered end of the Setting Tool into the anchor and push down firmly against this. Using a heavy hand hammer, strike the Setting Tool with repeated sharp blows.
6. The anchor is completely set when it has fully expanded over the plug and set down tightly in the hole.
7. Position the object to be fastened over the anchor and bolt into place.



STAR EXPANSION COMPANY - Example #3

## WEDGE-GRIP ANCHOR



### Specifications:

\* TORQUE  
FT-LB:

Wedge-Grip Size	Wedge-Grip Thread Length	Minimum Embedment	Drill Bit Diameter	Pull Out Test in 4000 P.S.I. Concrete	
				Tensile	Shear
1/4"	3/4"	1-1/8"	1/4"	1,640 lbs	1,200 lbs
3/8"	7/8" or 1-1/8"	1-5/8"	3/8"	3,040 lbs	4,300 lbs
1/2"	1-1/8 or 1-1/4"	2-1/4"	1/2"	4,300 lbs	6,240 lbs
5/8"	1-1/2"	2-3/4"	5/8"	6,020 lbs	9,060 lbs
3/4"	1-3/4"	3-1/4"	3/4"	8,620 lbs	13,100 lbs
7/8"	1-3/4"	4"	7/8"	12,000 lbs	19,200 lbs
1"	2-1/4"	4-1/2"	1"	17,000 lbs	25,200 lbs
Suggested Safe Working Load: 1/4 of the average maximum proof test load.					

*Suggested Safe Working Load: 1/4 of the average maximum proof test load.*

Note: All weight and load conditions described or referenced in this material were determined under laboratory conditions. Material and installation conditions vary in the field. To determine your holding factors, test product in actual conditions and material.

\* REFERENCED FROM ICBO REPORT NOS. 2876 + 3304  
FOR ISO BOLT + ZINS WEDGE TYPE STUD BOLT ANCHORS

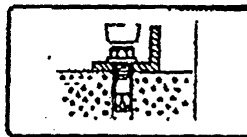
### Installation:

The STAR Wedge-Grip Anchor requires no maximum hole depth. The depth of the hole in the concrete should be the length of the stud bolt minus the thickness of the material being fastened. This will result in some extra depth to accommodate a minor amount of concrete cuttings which you might not be able to clean out of the hole.

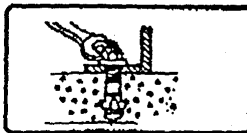
1. Drill hole into the concrete with a STAR carbide tipped masonry drill the same size as the Wedge-Grip Anchor. If the fixture being fastened is in place and being used as a template to locate the Wedge-Grip Anchor, the mounting hole in the fixture should afford clearance for the wedge clip on the stud.



2. Place the Wedge-Grip Anchor through the hole in the fixture and hammer drive it into the hole drilled in the concrete until the washer becomes flush with the surface of the fixture.



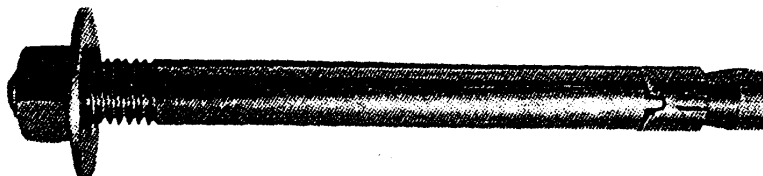
3. Turn the nut by hand until the unit is snugged up. Turn the nut with a wrench, approximately three full turns, to complete the fastening.



WEJ-IT - Example #1



## ANKR-TITE® / STUD ANCHORS



- Bolt size is hole size.
- Extra heavy duty washer.
- Safety shoulder to maximize holding ability.
- Flex fold ears to grip the concrete.

- Made by Wej-It in the U.S.A.
- Clip design enhances easy hole installation.
- Safe-sure grip speeds setting in three turns.
- Highest performance standard in the industry.

ANCHOR DIAMETER AND LENGTH	MINIMUM EMBEDMENT (IN.)	MAXIMUM THICKNESS OF MATERIAL TO BE FASTENED (IN.)	QUANTITY BOX/CARTON	ZINC PLATED CATALOG NUMBER	MECHANICAL OR HOT DIP GALVANIZED CATALOG NUMBER	STAINLESS STEEL 302 HQ/303 CATALOG NUMBER	STAINLESS STEEL 316 CATALOG NUMBER
1/4 x 1 3/4 1/4 x 2 1/4 1/4 x 3 1/4	1 3/8	1/8 5/8 1 5/8	100/800 100/800 100/800	AT1413 AT1421 AT1431		ATS1413 ATS1421 ATS1431	ATSS1421 ATSS1431
3/8 x 2 1/4 3/8 x 2 3/4 3/8 x 3 3/8 x 3 3/4 3/8 x 5	1 3/4	1/8 5/8 7/8 1 5/8 2 7/8	50/400 50/400 50/400 50/400 50/300	AT3821 AT3823 AT3830 AT3833 AT3850	ATG3823  ATG3833	ATS3821 ATS3823 ATS3830 ATS3833 ATS3850	ATSS3823 ATSS3830 ATSS3833
1/2 x 2 3/4 1/2 x 3 3/4 1/2 x 4 1/4 1/2 x 5 1/2 1/2 x 7	2 1/8	1/8 1 1/8 1 5/8 2 7/8 4 3/8	25/200 25/200 25/200 25/150 25/150	AT1223 AT1233 AT1241 AT1252 AT1270	ATG1223 ATG1233 ATG1241 ATG1252	ATS1223 ATS1233 ATS1241 ATS1252 ATS1270	ATSS1223 ATSS1233 ATSS1241 ATSS1252
5/8 x 3 1/2 5/8 x 4 1/4 5/8 x 5 5/8 x 6 5/8 x 7 5/8 x 8 1/2	2 5/8	1/4 1 1 3/4 2 3/4 3 3/4 5 1/4	10/80 10/80 10/80 10/80 10/80 10/40	AT5832 AT5841 AT5850 AT5860 AT5870 AT5882	ATG5841 ATG5850 ATG5860	ATS5832 ATS5841 ATS5850 ATS5860 ATS5870 ATS5882	ATSS5841 ATSS5850 ATSS5860
3/4 x 4 1/4 3/4 x 4 3/4 3/4 x 5 1/2 3/4 x 7 3/4 x 8 1/2 3/4 x 10 3/4 x 12	3 1/4	1/4 3/4 1 1/2 3 4 1/2 6 8	10/80 10/80 10/60 10/60 10/40 10/40 5/20	AT3441 AT3443 AT3452 AT3470 AT3482 AT3410 AT3412	ATG3443 ATG3452  ATG3482	ATS3441 ATS3443 ATS3452 ATS3470 ATS3482 ATS3410 ATS3412	ATSS3443 ATSS3452 ATSS3470
1 x 6 1 x 9 1 x 12	4 1/2	1/2 3 1/2 6 1/2	5/30 5/20 5/20	AT1060 AT1090 AT1012		ATS1060 ATS1090 ATS1012	

**NOTE:** Nuts and Washers included.  
Zinc Plated to ASTM B-633 Type III, SCI. Clear Chromate added.  
Grades 304, 316 Stainless available upon request. Unpublished sizes available upon request.  
Mechanical Galvanized ASTM B-695 Type I, Class 2S (Furnished with Stainless Steel Expansion Ring).  
Special lengths available upon request.  
GSA Specification FF-S-325, Group II, Type 4, Class I.

WEJ-IT - Example #2

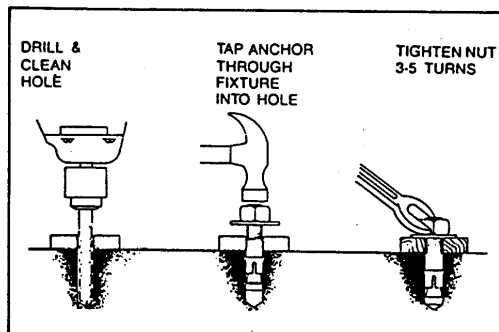


## ANKR-TITE® / STUD ANCHORS

### TECHNICAL INFORMATION

#### Ankr-tite® Installation Instructions

1. Always wear safety glasses.
2. Follow the drill manufacturer's safety instructions.
3. Use only solid carbide-tipped bits meeting the ANSI B94 tip diameter standard as shown on page 9.
4. Drill the hole perpendicular to the work surface. To assure full holding power, do not ream the hole or allow the drill to wobble.
5. Drill the hole as deep as the full length of the anchor, but not closer than two anchor diameters to the bottom (opposite) surface of the concrete. Through drilling is allowed when using sleeve anchors in hollow concrete block.
6. Clean the hole using compressed air and a wire brush. A clean hole is necessary for proper performance.
7. Assemble the washer and nut on the anchor so the nut protrudes slightly beyond the thread.
8. Tap the anchor through the fixture and into the hole, making sure the nut or head rests solidly against the fixture.
9. Tighten the nut or head 3-5 turns past the hand tight position.



Sources: U.S. Testing Co., Inc., Tulsa, Oklahoma. Tested to ASTM E488 Test Standard. Bit diameters to ANSI B94.

Use one-fourth of values shown for a recommended 4 - 1 safety factor. Test report, dated December 17, 1984, available on request.

#### THREAD LENGTH

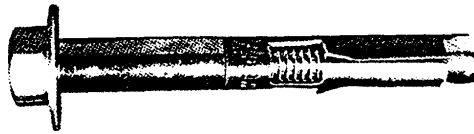
Ankr-tite Stud Anchors	
Dia.	Thread Length
1/4	1"
3/8	1 1/4"
1/2	1 1/2"
5/8	1 3/4"
3/4	2"
1	2 1/4"

Thread UNC Class 2A.

WEJ-IT - Example #3



## SLEEVE ANCHORS

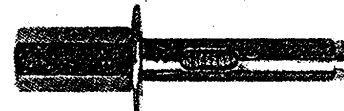


- Bolt size is hole size.
- Fully assembled and ready to use.
- Flex-fold ears eliminates rotation in the hole.
- Unique pillar design maximizes clamping ability.
- Rapid expansion sets in three turns.
- Highest performance standards in the industry.
- Useable in all masonry material - poured concrete or hollow concrete block.

HEAD STYLE	ANCHOR DIAMETER, AND LENGTH (IN.)	MINIMUM EMBEDMENT (IN.)	MAX. THICKNESS OF MATERIAL TO BE FASTENED (IN.)	QUANTITY BOX/CARTON	CATALOG NUMBER
HEX NUT	5/16 x 1 1/2	1 1/4	5/16	100/800	HSA 5612
	5/16 x 2 1/2		1 5/16	100/800	HSA 5622
	3/8 x 1 7/8	1 1/2	3/8	50/400	HSA 3813
	3/8 x 3		1 1/2	50/400	HSA 3830
	1/2 x 2 1/4	1 7/8	7/16	25/200	HSA 1221
	1/2 x 3		1 3/16	25/200	HSA 1230
	1/2 x 4		2 3/16	25/200	HSA 1240
	5/8 x 2 1/4	2	1/2	25/200	HSA 5821
	5/8 x 3		1 1/4	25/200	HSA 5830
	5/8 x 4 1/4		2 1/2	10/80	HSA 5841
	5/8 x 6		3 3/4	10/80	HSA 5860
ROD COUPLING	3/4 x 2 1/2	2 1/4	1/4	10/80	HSA 3422
	3/4 x 4		1 3/4	10/80	HSA 3440
	3/4 x 6 1/4		4	10/80	HSA 3461
	3/8 x 1 7/8	1 1/2	3/8	50/400	CSA 3813
	1/2 x 2 1/4	1 7/8	7/16	25/200	CSA 1221



HEX NUT

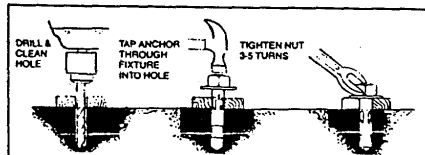


ROD COUPLING

NOTE: Zinc Plated to ASTM B-633 Type III, SCl. Clear Chromate added.  
GSA Specification FF-S-325, Group II, Type 3, Class 3.  
Thread UNC Class 1A.

### Sleeve Anchors Installation Instructions

1. Always wear safety glasses.
2. Follow the drill manufacturer's safety instructions.
3. Use only solid carbide-tipped bits meeting the ANSI B94 tip diameter standard as shown on page 9.
4. Drill the hole perpendicular to the work surface. To assure full holding power, do not ream the hole or allow the drill to wobble.
5. Drill the hole as deep as the full length of the anchor, but not closer than two anchor diameters to the bottom (opposite) surface of the concrete. Through drilling is allowed when using sleeve anchors in hollow concrete block.
6. Clean the hole using compressed air and a wire brush. A clean hole is necessary for proper performance.
7. Assemble the washer and nut on the anchor so the nut protrudes slightly beyond the thread.
8. Tap the anchor through the fixture and into the hole, making sure the nut or head rests solidly against the fixture.
9. Tighten the nut or head 3-5 turns past the hand tight position.



Sources: U.S. Testing Co., Inc., Tulsa, Oklahoma. Tested to ASTM E488 Test Standard. Bit diameters to ANSI B94. Use one-fourth of values shown for a recommended 4 - 1 safety factor. Test range 1000 - 10000 psi.

WEJ-IT - Example #4



## DROP-IN ANCHORS

SIZE (IN.)	QUANTITY BOX/CARTON	ZINC PLATED CATALOG NUMBER	SETTING TOOLS CATALOG NUMBER
1/4	100/1000	WD-14	ST-14
3/8	50/500	WD-38	ST-38
1/2	50/400	WD-12	ST-12
5/8	25/200	WD-58	ST-58
3/4	25/100	WD-34	ST-34

NOTE: To achieve proper setting and anchor performance, use only ANKR-TITE Setting Tools. Zinc Plated to ASTM B-633 Type III, SCl. Fed. Spec. QQZ-325C, Type II, Class 3. Clear Chromate added. GSA Specification FF-S-325, Group VII, Type I. Thread UNC Class 2A.



### Drop-In Anchors Installation Instructions

1. Always wear safety glasses.
2. Follow the drill manufacturer's safety instructions.
3. Select the proper size drill bit from the chart below. Use only solid carbide-tipped bits meeting the ANSI B94 tip diameter standard as shown on page 9.
4. Drill the hole perpendicular to the work surface. To assure full holding power, do not ream the hole or allow the drill to wobble.
5. Drill the hole as deep as the full length of the anchor, but not closer than two anchor diameters to the bottom (opposite) surface of the concrete.
6. Clean the hole using compressed air and a wire brush. A clean hole is necessary for proper performance.
7. Tap the anchor into the hole, making sure that the top of the anchor is flush with or below the work surface.
8. Insert the setting tool provided into the threaded end of the anchor and expand the anchor by striking the end of the setting tool with a hammer. The anchor is set (fully expanded) when the shoulder of the setting tool touches the anchor. Full expansion is necessary for proper anchor performance.

## TECHNICAL INFORMATION

### Maximum Tensile and Shear Values

As tested in 28-day unreinforced stone aggregate concrete.

Anchor/NC Thread Size (in.)	Drill/Hole Size (in.)	Length Embedment (in.)	4000 psi	
			Tensile	Shear
1/4	3/8	1	3399	1597
3/8	1/2	1 5/8	5456	3931
1/2	5/8	2	8785	6599
5/8	7/8	2 1/2	13980	11365
3/4	1	3 1/4	19353	16740

Sources: U.S. Testing Co., Inc., Tulsa, Oklahoma. Tested to ASTM E488 Test Standard. Bit diameters to ANSI B94.

Use one-fourth of values shown for a recommended 4 - 1 safety factor. Test report, dated March 27, 1985, available on request.



## WEJ-IT - Example #5



CHEMICAL FASTENING :  
by UPAT

## CHEMICAL MORTAR CARTRIDGE

### Dimensions And Specifications

One UPAT® Chemical Mortar Cartridge provides 8.5 cubic inches of useable resin mortar. The following threaded rod specifications are examples of some applications. Virtually any application is possible. Product Bulletins giving specifications in greater detail (shallower embedments, deeper embedments, other fixture, etc.) are available upon request.

### Test Data

The following test data is an example of the holding power of UPAT® Chemical Mortar when anchoring threaded rod to concrete. The results will vary for other fixtures and/or base materials. Product Bulletins giving test data in greater detail (shallower embedments, deeper embedments, other fixtures, etc.) are available upon request.

These test results are given purely as a guide. Note that concrete strengths may vary greatly. In all cases, it is recommended that tests to simulate actual conditions be carried out to determine suitability of UPAT® Chemical Mortar for a particular application.

THREADED ROD SIZE	DRILL SIZE*	EMBEDMENT DEPTH	STUDS PER CARTRIDGE**
1/4"-20	5/16"	1-1/2"	95
5/16"-18	3/8"	1-7/8"	56
3/8"-16	1/2"	2-1/4"	24
1/2"-13	5/8"	3"	14
5/8"-11	3/4"	3-3/4"	8
3/4"-10	7/8"	4-1/2"	5
7/8"-9	1"	5-1/4"	4
1"-8	1-1/8"	6"	2-1/2
1-1/4"-7	1-3/8"	7-1/2"	1-1/2

\* Per ANSI B94.12-1977

\*\* One cartridge provides 8.5 cubic inches mortar

THREADED ROD SIZE	DRILL SIZE*	EMBEDMENT DEPTH	ULT. TENSILE LOAD**	ULT. SHEAR LOAD**
1/4"-20	3/8"	1-1/2"	1,035 lbs.	1,440 lbs.
1/2"-13	5/8"	3"	7,595 lbs.	6,685 lbs.
3/4"-10	7/8"	4-1/2"	13,910 lbs.	19,445 lbs.
1"-8	1-1/8"	6"	19,465 lbs.	26,775 lbs.

\* Per ANSI B94.12-1977

\*\* SAE Grade 2 Threaded Rod tested in 4430 PSI (28 days) normal weight, hard rock aggregate concrete. Ultimate values are shown. Actual results may vary and are dependent upon proper installation. General industry practice for static loads is to use a safety factor of 4:1 to obtain working loads.

Tested in accordance with ASTM E488; test standards.

The UPAT® Chemical Mortar Cartridge is a unique, non-expanding chemical anchoring system that enables you to bond almost any kind of structural bar to almost any kind of building material ... with no mess or complicated preparation!

Inside the cartridge are separate compartments containing premeasured amounts of polyester resin, quartz sand aggregate, and hardener. Pump the "T" handled plunger, and the three components are accurately, safely, and neatly mixed ... all within the cartridge! Insert the activated cartridge into an ordinary caulking gun and you are ready to use!

The UPAT® Chemical Mortar Cartridge offers all the exceptional advantages of non-expanding chemical capsule anchoring:

- HIGH PULL-OUT LOADS
- IDEAL FOR VIBRATORY LOADS
- REDUCED CENTER-TO-CENTER AND CENTER-TO-EDGE DISTANCES
- MINIMAL "CREEP" OVER TIME
- USED WITH A WIDE VARIETY OF MATERIALS FROM SOFT BRICK TO HARD MARBLE OR GRANITE
- NO EXPANSION STRESS PLACED ON CONSTRUCTION MATERIALS
- CAN BE SET IN MOST WEATHER CONDITIONS
- COMPONENTS ARE PRE-MEASURED TO PREVENT JOE BLOWING ERRORS AND ASSURE CORRECT DOI
- SEALS OUT HARMFUL CORROSIVES
- US THE FOLLOWING ADDED ADVANTAGES

### Fills Voids

Useful for problem areas. Fills voids, cracks,

fissures, crevices, and irregular holes to permanently anchor fixtures. Perfect for brick building restoration.

### Versatile

Chemically bonds studs, dowels, rebar, wire, flat bars, hooks ... almost any metal fixture to granite, marble, stone, concrete, hollow brick, and block. UPAT® Chemical Mortar Cartridge is the right choice for these problem fastenings:

- VERY SHALLOW OR VERY DEEP EMBEDMENTS
- SMALL DIAMETER FIXTURES
- ODD SHAPED FIXTURES (FLAT BARS, SQUARE TUBES, ETC.)
- FASTENINGS TO BRITTLE BASED MATERIALS

### Easy, No-Fuss Mixing

Just pump the "T" handled plunger to mix the sealed components. When the mortar turns red, it is properly mixed and ready to use.

### No Special Tools Required

All mixing hardware comes with the cartridge. Application of the activated mortar is performed with a standard caulking gun. Fixtures are installed by hand, with no need for special drive units or adapters.

### Storage Recommendations

For maximum shelf life, UPAT® Chemical Mortar Cartridges should be stored out of direct light in a controlled environment: 50°F to 100°F, well ventilated, and dry. Shelf life of up to one year is possible, but higher ambient temperatures and ultraviolet rays may shorten shelf life.

polyester resin and significantly reduce shelf life. An expiration date is shown on each cartridge.

### IMPORTANT

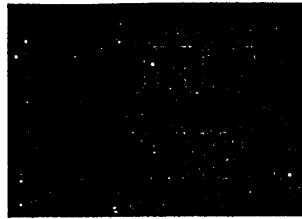
- WEAR SAFETY GOGGLES AND PROTECTIVE CLOTHING.
- AVOID FUMES AND CONTACT WITH EYES AND SKIN.
- Activated mortar must be completely used within the recommended working time. Working time will vary with temperature and other field conditions. (See maximum working time in chart below.) It is recommended that application preparations be completed before mixing cartridge.

BASE MATERIAL TEMP.	MAXIMUM WORKING TIME	MINIMUM CURE TIME
104°F	5 min.	20 min.
68°F	20 min.	80 min.
32°F	120 min.	360 min.

DO NOT USE BELOW 32° F

- Do not disturb or load fastening until fully cured. Cure time will vary with temperature and other field conditions (see chart above).
- Using in concrete cured less than 7 days will greatly reduce anchor strength.
- Because dust in hole will significantly reduce fastening strength, operator must make special effort to clean hole thoroughly.
- When bonding smooth fixtures deform section of fixture to be embedded.
- Tubing should be plunger to prevent mortar

U.S. ANCHOR CORPORATION - Example #1



Buyline 6878

*"We know U.S. Anchor has excellent products and prices but what we most appreciate is your great service and friendly voices."*

Sharon Kubik  
Youngstown Bolt & Supply  
Youngstown, Ohio

The Kingpin Wedge Anchor is used for heavy duty fastening applications where high pullout values are required. The anchor and the hole diameter are the same, simplifying the anchor installation. The advanced design of the collar, with three protruding prongs to grip the interior of the hole, reduces the likelihood of the anchor's "spinning" during installation. In addition, hole depth is not critical, as the wedge is non-bottom bearing, although the hole must be at least as deep as the minimum embedment depth listed below. Proper installation requires cleaning out the hole. For maximum strength, the wedge anchor should be installed using a torque wrench set to the suggested level as provided in the instruction sheet. The wedge is used in a wide variety of structural applications, including fastening sheet metal, steel, aluminum angles or wood to concrete. Pipe-hanging, tilt-ups, bridges, elevator equipment, conveyors and highway construction frequently require the wedge type anchor. Due to its high resistance to vibratory loads, the wedge anchor is ideal for installing machinery, hand rails, dock bumpers & storage racks, etc. Wedge anchors are sold together with the appropriate nuts and washers, unassembled.

See ReCOIL Anchor for alternatives

CARBON STEEL ITEM CODE	304 304L STAINLESS STEEL ITEM CODE	316 STAINLESS STEEL ITEM CODE	RECOIL ADVANCED ITEM CODE	DRILLER & LENGTH	MINIMUM EMBEDMENT	MINIMUM LENGTH	BOX MIN QUANTITY	WEIGHT (LBS.) PER 100
W1416	W1416S	W1416S3		1/4" x 1 3/4"	1 1/8"	3/4"	100/1000	3.32
W1422	W1422S	W1422S3		1/4" x 2 1/4"	1 1/8"	3/4"	100/1000	3.92
W1432	W1432S			1/4" x 3 1/4"	1 1/8"	3/4"	100/1000	5.20
W3822	W3822S			3/8" x 2 1/4"	1 5/8"	7/8"	100/1000	8.22
W3826	W3826S	W3826S3		3/8" x 2 3/4"	1 5/8"	1 1/8"	100/1000	10.50
W3830	W3830S	W3830S3		3/8" x 3"	1 5/8"	1 1/8"	100/1000	11.36
W3836	W3836S	W3836S3		3/8" x 3 3/4"	1 5/8"	1 1/8"	100/1000	13.38
W3850	W3850S	W3850S3		3/8" x 5"	1 5/8"	1 1/8"	50/500	16.84
W3864	W3864S			3/8" x 6 1/2"	1 5/8"	1 1/8"	50/500	22.36
W1226	W1226S	W1226S3	W1226G	1/2" x 2 3/4"	2 1/4"	1 1/4"	50/500	20.00
W1236	W1236S	W1236S3		1/2" x 3 3/4"	2 1/4"	1 1/4"	50/500	26.12
W1242	W1242S	W1242S3	W1242G	1/2" x 4 1/4"	2 1/4"	1 1/4"	25/250	28.48
W1254	W1254S	W1254S3	W1254G	1/2" x 5 1/2"	2 1/4"	1 1/4"	25/250	32.48
W1270	W1270S	W1270S3	W1270G	1/2" x 7"	2 1/4"	1 1/4"	25/250	43.52
W1284	W1284S			1/2" x 8 1/2"	2 1/4"	1 1/4"	25/100	53.44
W12100	W12100S			1/2" x 10"	2 1/4"	1 1/4"	25/100	58.24
W12120	W12120S			1/2" x 12"	2 1/4"	1 1/4"	25/100	69.68
W5834	W5834S	W5834S3	W5834G	5/8" x 3 1/2"	2 3/4"	1 1/2"	25/250	41.60
W5844	W5844S	W5844S3		5/8" x 4 1/2"	2 3/4"	1 1/2"	25/250	47.04
W5850	W5850S	W5850S3	W5850G	5/8" x 5"	2 3/4"	1 1/2"	25/250	46.56
W5860	W5860S	W5860S3	W5860G	5/8" x 6"	2 3/4"	1 1/2"	25/250	57.84
W5870	W5870S	W5870S3		5/8" x 7"	2 3/4"	1 1/2"	25/250	72.40
W5884	W5884S	W5884S3		5/8" x 8 1/2"	2 3/4"	1 1/2"	25/100	83.84
W58100	W58100S			5/8" x 10"	2 3/4"	1 1/2"	10/40	96.60
W58120	W58120S			5/8" x 12"	2 3/4"	1 1/2"	10/40	102.97
W3442	W3442S	W3442S3		3/4" x 4 1/4"	3 3/8"	1 1/2"	20/200	65.20
W3446	W3446S	W3446S3	W3446G	3/4" x 4 3/4"	3 3/8"	1 1/2"	20/200	71.70
W3454	W3454S	W3454S3	W3454G	3/4" x 5 1/2"	3 3/8"	1 1/2"	20/80	78.40
W3462	W3462S			3/4" x 6 1/4"	3 3/8"	1 1/2"	10/100	90.60
W3470	W3470S	W3470S3		3/4" x 7"	3 3/8"	1 1/2"	10/100	98.00
W3484	W3484S	W3484S3	W3484G	3/4" x 8 1/2"	3 3/8"	1 1/2"	10/40	118.00
W34100	W34100S			3/4" x 10"	3 3/8"	1 1/2"	10/40	138.80
W34120				3/4" x 12"	3 3/8"	1 1/2"	10/40	169.20
W7860	W7860S		W7860G	7/8" x 6"	4"	2 1/4"	5/50	126.40
W7880	W7880S		W7880G	7/8" x 8"	4"	2 1/4"	5/20	160.80
W78100	W78100S			7/8" x 10"	4"	2 1/4"	5/20	197.20
W10060	W10060S			1" x 6"	4 1/2"	2 1/4"	5/50	170.80
W10090	W10090S		W10090G	1" x 9"	4 1/2"	2 1/4"	5/20	240.00
W100120	W100120S			1" x 12"	4 1/2"	2 1/4"	5/20	288.00
W100150				1" x 15"	4 1/2"	2 1/4"	BULK	366.40
W11490				1 1/4" x 9"	5 5/8"	3 1/4"	BULK	367.60
W114120				1 1/4" x 12"	5 5/8"	3 1/4"	BULK	460.00

U.L. Listed, FM Approved, ICBO, GSA Spec. FF-S325 Group II, Type 4 Class 1, Los Angeles City Approval. DOT Approvals may vary on file. Utility Approvals on file.

\*Other sizes of 316 S/S available upon special request.

Minimum embedment for satisfactory anchor performance is 4 1/2 bolt diameters. Deeper embedments will yield higher tension and shear capacity.

CEB CORPORATION - Example #1



**GREATER HOLDING POWER!**

Projections on the spring steel expansion collar of CEB's WedgeStud anchor dig into the concrete when the anchor is tapped into a pre-drilled hole. As the nut is tightened, the anchor pulls up, expanding the collar and securing the fixture. The more load applied to the anchor, the greater the expansion and the greater the holding power.

**FAST, EASY INSTALLATION**

The drilled hole diameter is the same size as the anchor diameter, which saves drilling time and reduces drill bit costs. The depth of the drilled hole is not critical as the anchor does not have to bottom in the hole to be set.

**ELIMINATES HOLE SPOTTING AND REPOSITIONING OF FIXTURES**

Holes can be drilled through the mounting holes of the fixture and the anchors can then be tapped into place and tightened.

**ZINC AND CHROMATE PLATING**

WedgeStuds are supplied with a zinc and chromate plating for extra protection. These anchors are also available with other platings or in stainless steel for special environmental requirements.

**WIRE**

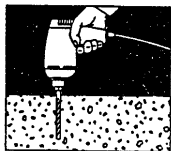
The wedge locking principle is ideally suited to overhead tie wire applications. The more weight hung from CEB's Tie Wire Anchor, the more the collar expands, increasing the holding power. No setting tools are required. The Tie Wire Anchor accommodates wire or rod up to one quarter inch in diameter. For loads over 500 lbs., it is best to set the Tie Wire WedgeStud by a pull with a claw hammer.

All sizes I.C.B.O. approved

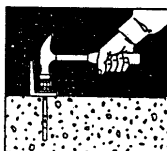
**the greater the load  
the tighter the anchor**

**FAST, SIMPLE INSTALLATION**

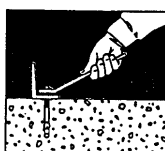
Select anchor long enough to accommodate thickness of fixture and nut, plus minimum imbedment indicated.



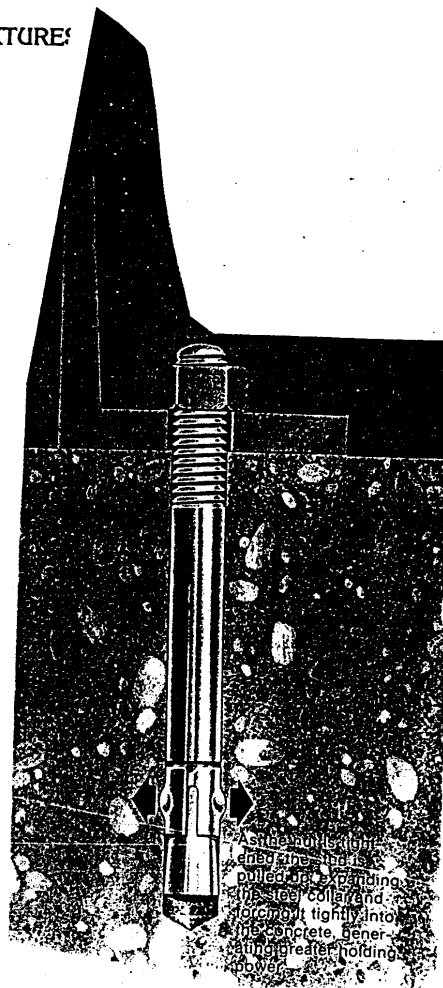
1. Hole the same diameter as WedgeStud. Hole can be drilled directly through mounting hole of fixture. The depth of hole should accommodate minimum recommended im-



2. Insert WedgeStud and tap into hole so that at least six threads are below the top surface of fixture.



3. Tighten the nut. Resistance will increase quickly after three or four complete turns.



CEB CORPORATION - Example #2



**WedgeStud ANCHORS SIZES and SPECIFICATIONS**

STOCK NUMBER	SIZE (inches)	THREAD LENGTH	HOLE SIZE	MINIMUM IMBEDMENT	QTY/PER BOX/CARTON	WEIGHT PER 100
8025-15	1/4 x 1-5/8	3/4"	1/4"	1-1/8"	100/900	3.4 lbs.
8025-21	1/4 x 2-1/4	3/4"	1/4"	1-1/8"	100/900	4.2 lbs.
8025-30	1/4 x 3	3/4"	1/4"	1-1/8"	100/900	5.5 lbs.
8037-21	3/8 x 2-1/8	7/8"	3/8"	1-5/8"	100/600	9.3 lbs.
8037-23	3/8 x 2-3/4	1-1/8"	3/8"	1-5/8"	100/600	10.0 lbs.
8037-30	3/8 x 3-3/4	1-1/8"	3/8"	1-5/8"	100/600	14.0 lbs.
8037-50	3/8 x 5	1-1/8"	3/8"	1-5/8"	50/300	17.8 lbs.
8050-23	1/2 x 2-3/4	1-1/8"	1/2"	2-1/4"	50/300	20.8 lbs.
8050-33	1/2 x 3-3/4	1-1/4"	1/2"	2-1/4"	50/200	26.0 lbs.
8050-57	1/2 x 5-1/2	1-1/4"	1/2"	2-1/4"	25/150	36.0 lbs.
8050-70	1/2 x 7	1-1/4"	1/2"	2-1/4"	25/100	44.0 lbs.
8062-31	5/8 x 3-1/2	1-1/2"	5/8"	2-3/4"	25/150	42.0 lbs.
8062-41	5/8 x 4-1/2	1-1/2"	5/8"	2-3/4"	25/150	55.0 lbs.
8062-60	5/8 x 6	1-1/2"	5/8"	2-3/4"	25/100	66.0 lbs.
8062-81	5/8 x 8-1/2	1-1/2"	5/8"	2-3/4"	25/75	88.0 lbs.
8075-41	3/4 x 4-1/4	1-1/2"	3/4"	3-1/4"	20/80	76.0 lbs.
8075-51	3/4 x 5-1/2	1-1/2"	3/4"	3-1/4"	20/80	86.0 lbs.
8075-70	3/4 x 7	1-1/2"	3/4"	3-1/4"	10/40	104.0 lbs.
8075-81	3/4 x 8-1/2	1-1/2"	3/4"	3-1/4"	10/30	124.0 lbs.
8075-10	3/4 x 10	1-1/2"	3/4"	3-1/4"	10/30	142.0 lbs.
8087-60	7/8 x 6	2-1/4"	7/8"	4"	10/40	128.0 lbs.
8087-80	7/8 x 8	2-1/4"	7/8"	4"	10/30	164.0 lbs.
8087-10	7/8 x 10	2-1/4"	7/8"	4"	10/30	200.0 lbs.
8087-12	7/8 x 12	2-1/4"	7/8"	4"	5/15	236.0 lbs.
8010-60	1 x 6	2-1/4"	1"	4-1/2"	5/30	170.0 lbs.
8010-90	1 x 9	2-1/4"	1"	4-1/2"	5/15	240.0 lbs.
8010-12	1 x 12	2-1/4"	1"	4-1/2"	5/15	308.0 lbs.
8014-80	1-1/4 x 9	3-1/4"	1-1/4"	5-1/2"	5/15	372.0 lbs.
8014-12	1-1/4 x 12	3-1/4"	1-1/4"	5-1/2"	5/15	472.0 lbs.

All stock numbers available in stainless steel.

CEB CORPORATION - Example #3



### GREATER HOLDING POWER

InterPlug anchors generate maximum holding power in concrete and other masonry materials. The smooth-walled anchor mates totally with the concrete as the anchor expands, providing an exceptional friction fit and maximum resistance to pull out forces.

The anchor expands uniformly over a larger area than other drop-in anchors. Pressure is consequently distributed over a wider area, generating greater holding power while minimizing stress on the concrete.

### EASY INSTALLATION

CEB's InterPlug anchors are easy to install. The pre-assembled, internal lug expander simplifies the setting of the anchor and eliminates any problems associated with dropped or lost plugs.

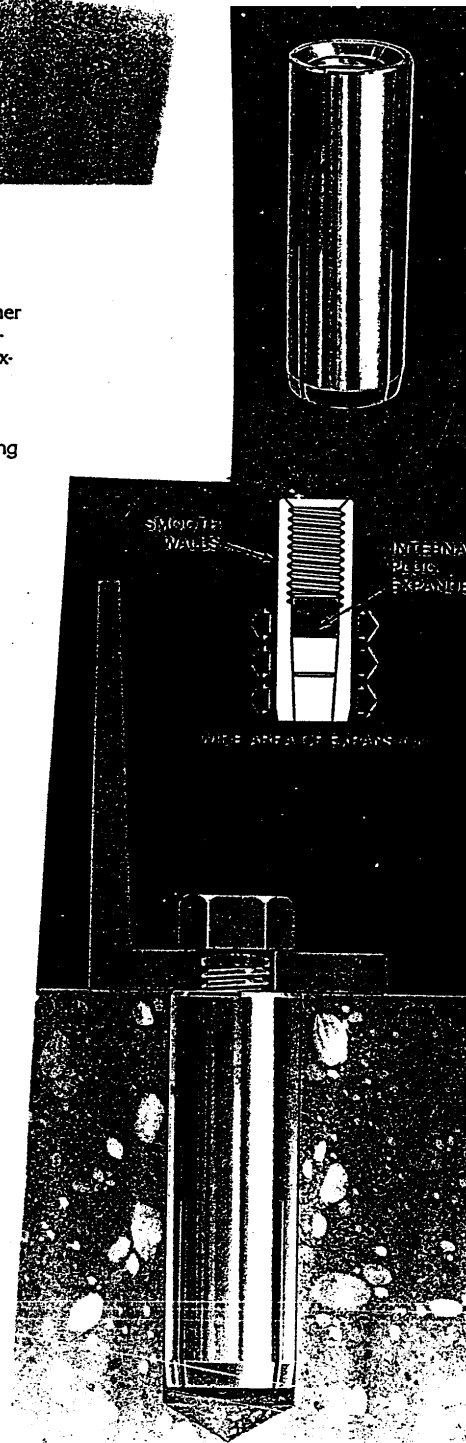
The expander plug can be set either with a hand-held hammer or with an impact tool. This permits the anchor to be set flush with the concrete or, if there is evidence of surface deterioration, the anchor can be set below the surface to maximize holding power and prevent spalling.

A smaller hole can be drilled for the InterPlug anchor than is required for other types of drop-in anchors.

### ZINC PLATING

InterPlug anchors are zinc plated for corrosion resistance. Other platings are available upon request.

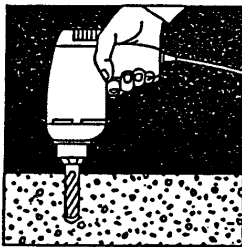
All sizes I.C.B.O. approved. U.L. and U.L.C. listed.



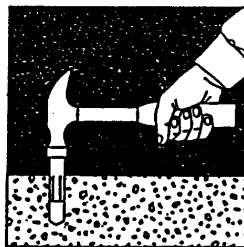
CEB CORPORATION - Example #4



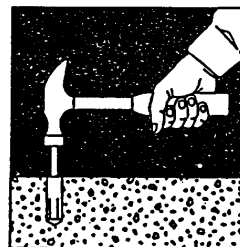
**FAST, SIMPLE INSTALLATION**



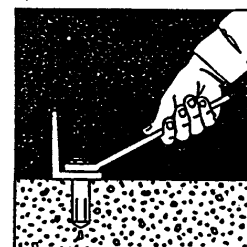
1. Drill hole 1/8" deeper than anchor length for flush mounting. Where surface deterioration is present drill hole somewhat deeper to permit anchor to be recessed below surface.



2. Drop InterPlug anchor into hole. If hole is slightly undersized, tap anchor in with hammer until it bottoms in hole.



3. To set expander plug, installation tool can be struck a few sharp blows with a hammer or an automatic air or electric tool can be used.



4. Place fixture in position, insert bolt and tighten.

**SIZES and SPECIFICATIONS**

STOCK NUMBER	BOLT SIZE	DRILL BIT DIAMETER	ANCHOR LENGTH	THREAD DEPTH	WEIGHT PER 100	BOX QTY	CARTON QTY	AVG. PULLOUT 4000 PSI CONCRETE**
7025-00	1/4"	5/16"	1"	7/16"	1.5 lb.	100	4000	2,220 lbs.
7037-00	3/8"	1/2"	1-1/2"	5/8"	6.3 lb.	50	1000	5,530 lbs.
7060-00	1/2"	5/8"	2"	11/16"	11.8 lb.	50	500	8,080 lbs.
7062-00	5/8"	7/8"	2-1/2"	7/8"	31.2 lb.	25	200	10,850 lbs.
7075-00	3/4"	1"	3-1/8"	1-3/8"	46.0 lb.	25	100	16,580 lbs.

\*For flush installation, add 1/8" to anchor length for minimum drilled hole depth.

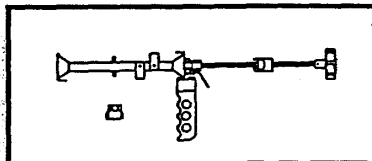
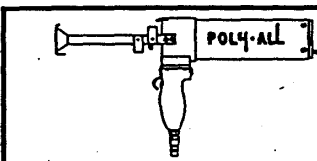
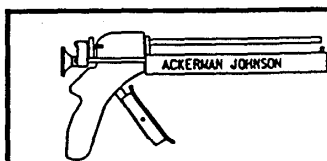
\*\*Values shown are results by a certified independent laboratory. A safety ratio of 4 to 1 should be applied to above figures. All tests conducted in non-reinforced concrete. Meets or exceeds U.S. Federal Specifications FF-S-325, Group 2, Type 4, Class 1, Interim amendment—3 (Dated 7-16-65).

**SETTING TOOLS**

STOCK NUMBER	ANCHOR BOLT SIZE
7025-11	1/4"
7037-11	3/8"
7060-11	1/2"
7062-11	5/8"
7075-11	3/4"

SIMPSON STRONG-TIE COMPANY, INC. - Example #1

## 4 POLY-ALL™ EPOXY ANCHORING SYSTEM

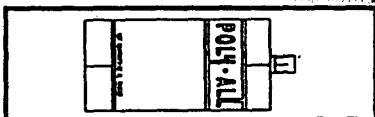


The Poly-All system consists of epoxy based chemical formulations, and unique mixing and dispensing tools that, in combination, provide a chemical anchor that is consistently reliable, has exceptional bonding strength and is easy and economical to use in a broad range of masonry applications.

### DISPENSING TOOLS

CATALOG NUMBER	DESCRIPTION	QUANTITY BOX	CTN	WEIGHT POUNDS EACH
PA-3000	MANUAL	1	1	6
PA-4000	PNEUMATIC	1	1	8
PA-3093	MANUAL (NEW)	1	1	6

### POLY-ALL CARTRIDGE (22 FLUID OUNCE/39.6 CUBIC INCH)

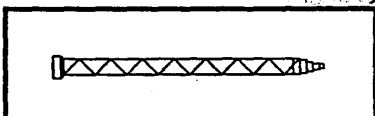


PAC-12*	WARM WEATHER-RAPID CURE (Use at temperatures above 45°F)	1	10	2
PAC-14*	COLD WEATHER-RAPID CURE (Use at temperatures 25°F-45°F)	1	10	2
PA-12*	RENOVATION FORMULATION-RAPID CURE (For use with screens)	1	10	2
PAC-24*	WARM WEATHER-STANDARD CURE (Use at temperatures above 40°F)	1	10	2

\*International Conference of Building Officials (ICBO)-Date submitted and listing applied for September, 1991.

\*City of Los Angeles (Renovation of Unreinforced Masonry Buildings)-Date submitted and approval applied for June, 1991.

### DISPOSABLE MIXERS



PAM-37	MIXER Holes Under 1/2" Dia.	Bulk	.1
PAM-50	MIXER Holes 1/2" Dia. and Larger	Bulk	.1
PAM-58	MIXER-High Volume Holes	Bulk	.1
PAM-500	MIXER COUPLING NUT	Bulk	.3

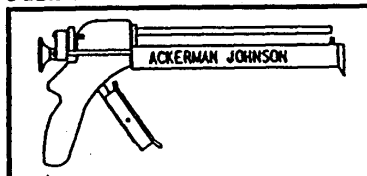
### HOLES/CARTRIDGE SET

BOLT DIAMETER	HOLE SIZE DIA.	DEPTH	POLY-ALL	MIDPAK	MINIPAK
3/8	7/16	3-1/2	145	71	12
1/2	9/16	4-1/4	81	40	7
5/8	3/4	5	31	15	2-3/4
3/4	7/8	6-5/8	18	9	1-1/2
7/8	1	7-1/2	13	7	1-1/4
1	1-1/8	8-1/4	9	5	1

SIMPSON STRONG-TIE COMPANY, INC. - Example #2

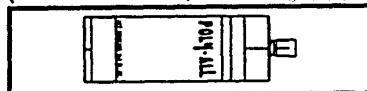
## POLY-ALL™ EPOXY ANCHORING SYSTEM (cont'd) 5

### MIDPAK TOOL



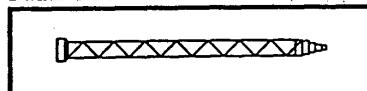
CATALOG NUMBER	DESCRIPTION	QUANTITY BOX	CTN	WEIGHT POUNDS EACH
PA-3094	MIDPAK TOOL	1	1	2.8

### MIDPAK CARTRIDGE (11 FLUID OUNCE/19.8 CUBIC INCH)



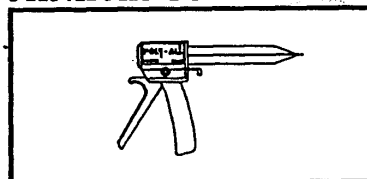
PAC-1220	WARM WEATHER-RAPID CURE (Use at temperatures above 45°F)	1	10	1.1
PAC-1420	COLD WEATHER-RAPID CURE (Use at temperatures 25°F-45°F)	1	10	1.1
RA-1220	RENOVATION FORMULATION RAPID CURE (For use with screens)	1	10	1.1
PAC-2420	WARM WEATHER-STANDARD CURE (Use at temperatures above 40°F)	1	10	1.10

### MIDPAK MIXER



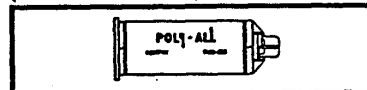
PAM-37	MIXER Holes Under 1/2" Dia.	Bulk		.1
PAM-50	MIXER Holes 1/2" Dia. and Larger	Bulk		.1
PAM-58	MIXER-High Volume Holes	Bulk		.1
PAM-500	MIXER COUPLING NUT	Bulk		.3

### MINIPAK TOOL



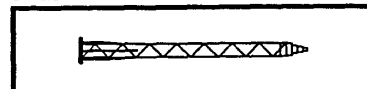
PA-30	MINIPAK TOOL	1	1	.6
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### MINIPAK CARTRIDGE (1.7 FLUID OUNCE/3.1 CUBIC INCH)



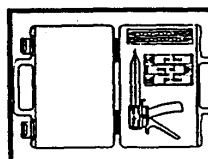
PAC-120	WARM WEATHER-RAPID CURE (Use at temperatures above 45°F)	12	24	.2
PAC-240	WARM WEATHER-STANDARD CURE (Use at temperatures above 40°F)	12	24	.2

### MINIPAK MIXER



PAM-25	MIXING NOZZLE	Bulk		.1
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### MINIPAK STARTER KIT



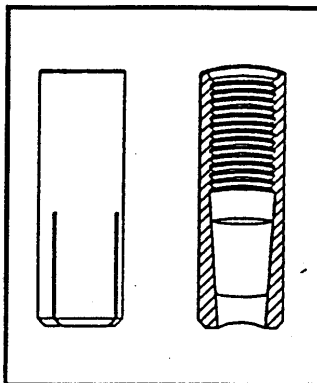
K-200	(1) PA-30 (3) PAC-120 (6) PAM-25 (1) Carrying Case	1	1	2.2
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SIMPSON STRONG-TIE COMPANY, INC. - Example #3

**10**

## DROP-IN ANCHOR



The Drop-In Anchor is an internally threaded expansion anchor which comes complete with a pre-assembled expander plug. The design of the anchor makes it ideal for flush mounted applications. The design of its four slots assures uniform and dependable expansion. Standard sizes accept 1/4-3/4 UNC bolts or threaded rod. Select sizes also available with internally tapped coil threads.

### MATERIAL SPECIFICATIONS

#### Zinc Plated Carbon Anchors

Anchor Body—AISI 12L14 Cold Rolled Steel. Meeting the chemical requirements of ASTM A-108.

Expander Plug—AISI 12L14/1215 Cold Rolled Steel. Meeting the chemical requirements of ASTM A-108

Thread—UNC 2B/Coil Thread

Plating—In accordance with Federal Specifications QQ-Z-325-C, Type II, Class 3

#### Stainless Steel

Anchor Body—AISI 303. Meeting the chemical requirements of ASTM A-582

Expander Plug—AISI 303

Thread—UNC 2B

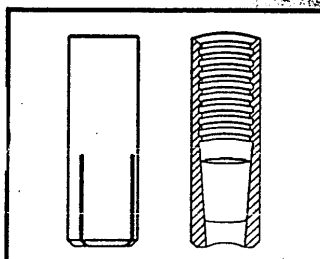
### SELECTION CHART

SIZE	CATALOG NUMBER	BOLT DIAMETER- THREADS PER INCH	RECOMMENDED SIZE OF HOLES		ULTIMATE PULLOUT (lbs)	ULTIMATE SHEAR (lbs)
			DIA	DEPTH		
1/4	763-25	1/4 - 20	7/16	1-1/8	2240	1520
3/8	763-37	3/8 - 16	1/2	1-5/8	4150	3370
1/2	763-50	1/2 - 13	5/8	2-1/4	6850	6075
5/8	763-62	5/8 - 11	7/8	2-3/4	12000	10800
3/4	763-75	3/4 - 11	1	3-1/4	16000	13500

Meets requirements of Federal Specification FFS-325, Group VIII, Type 1. Test results in approximately 4500 PSI Concrete.

### ORDER INFORMATION

SIZE	CATALOG NUMBER (CARBON STEEL)	CATALOG NUMBER (STAINLESS STEEL)	QUANTITY BOX CTN	WEIGHT PER 100 (lbs)
1/4	763-25	763-25SS	100 500	3
3/8	763-37	763-37SS	50 250	7
1/2	763-50	763-50SS	50 200	13
5/8	763-62	763-62SS	25 100	26
3/4	763-75	763-75SS	20 80	50



## COIL THREAD DROP-IN ANCHOR

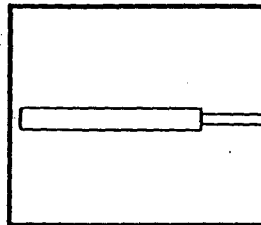
SIZE	CATALOG NUMBER	QUANTITY BOX CTN	WEIGHT PER 100 (lbs)
1/2	763-50C	50 200	13
3/4	763-75C	20 80	50

SIMPSON STRONG-TIE COMPANY, INC. - Example #4

## DROP-IN ANCHOR (cont'd)

11

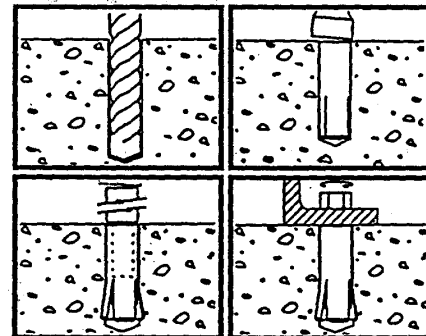
### SETTING TOOL



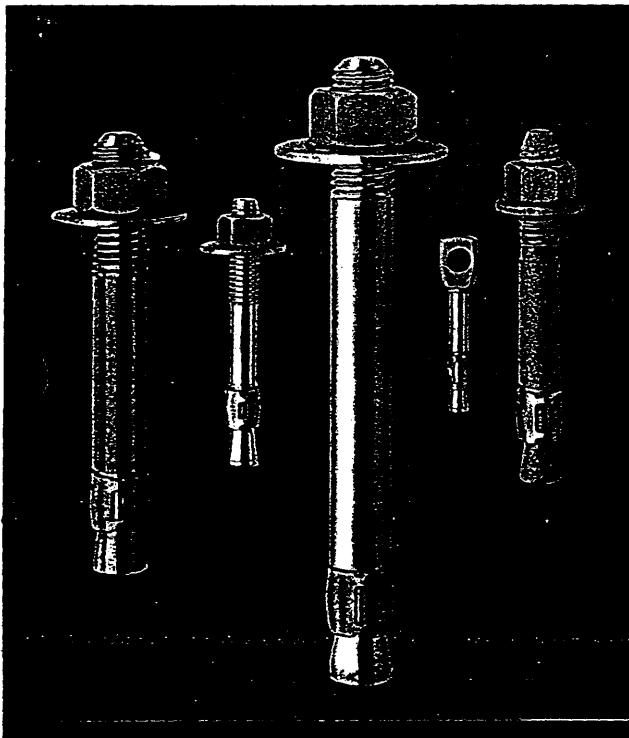
SIZE	CATALOG NUMBER	QUANTITY PER BOX
1/4	793-25-3	Bulk
3/8	793-37-3	Bulk
1/2	793-50-3	Bulk
5/8	793-62-3	Bulk
3/4	793-75-3	Bulk

### INSTALLATION PROCEDURE

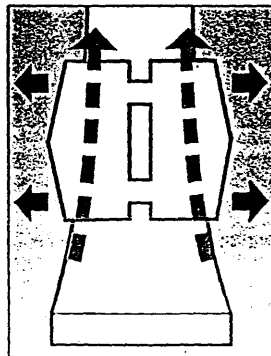
1. Drill hole 1/8" deeper than anchor length for flush mounting.  
Where surface deterioration is present drill hole somewhat deeper to permit anchor to be recessed below surface.
2. Drop anchor into hole. If hole is slightly undersized, tap anchor in with hammer until it bottoms in hole.
3. To set expander plug, strike installation tool with hammer.
4. Place fixture in position, insert bolt and tighten.



COBRA ANCHORS CORPORATION - Example #1



The PARABOLT Concrete Anchor combines heavy duty static load fastening capability in an easy-to-install anchor that can be loaded as soon as installed: Just drill the hole, insert the PARABOLT Concrete Anchor, and tighten! As the nut is tightened, the "Parabolic" shaft is pulled up, widening the one-piece stainless steel clip into the sides of the hole.



### CHOICE OF BOLT MATERIALS

The PARABOLT Concrete Anchor is stocked in four types to meet a wide variety of anchoring requirements: Grade 2 with zinc plating and clear chromate, Grade 5 with zinc plating and gold chromate, Grade 5 galvanized, and stainless steel.

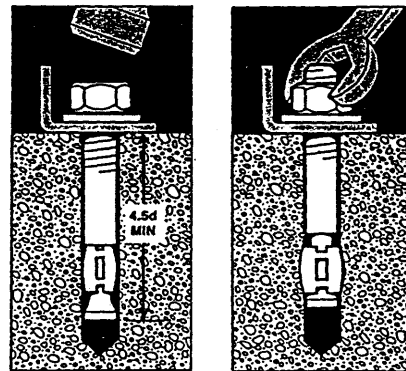
### ONE-PIECE STAINLESS STEEL CLIP

Formed around the bolt in one piece, the PARABOLT Concrete Anchor's #304 stainless steel clip won't work loose or fall off during shipping or installation, and provides maximum resistance to corrosion and the pressures of installation.

### HOLE SIZE IS BOLT SIZE

The PARABOLT Concrete Anchor eliminates the need to drill an oversized hole, resulting in a minimum volume of concrete removed. This also avoids the confusion of choosing the right drill size.

### EASY-TO-INSTALL

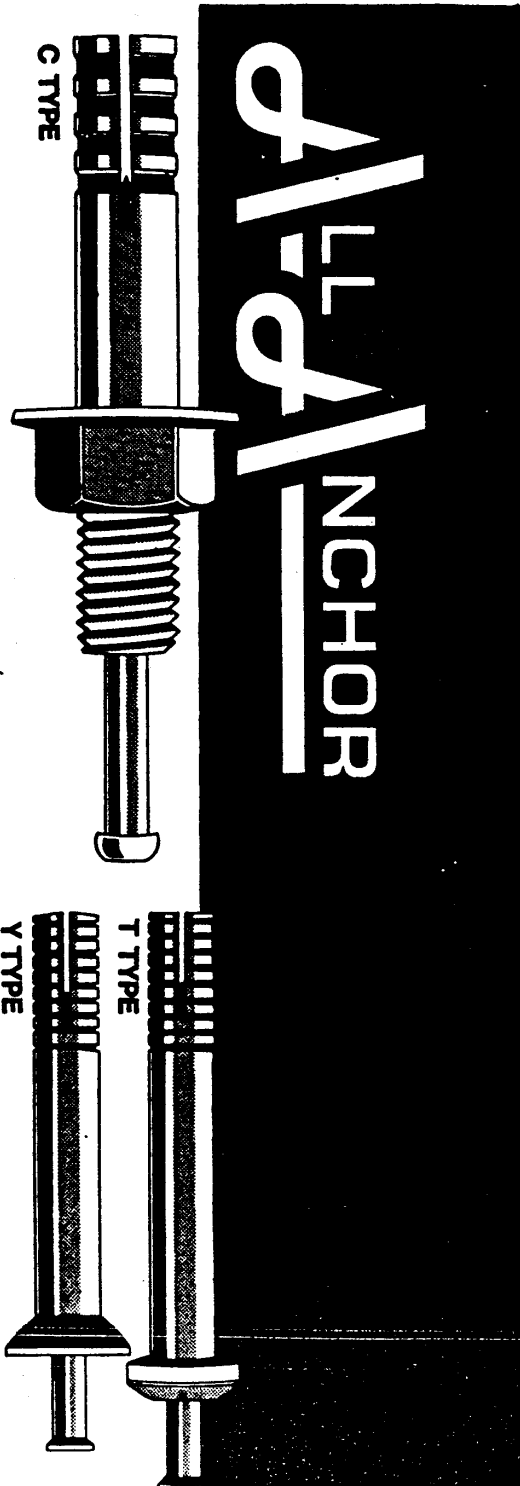


1. Using carbide bit (ANSI B94.12-1977) in same size as bolt diameter (d), drill hole deeper than bolt embedment (minimum 4.5 d). Do not use core bits. Maintain accurate hole size.
2. Clean hole of debris.
3. Add washer and thread nut flush with top of bolt. Drive bolt into hole through item to be fastened.
4. To set, tighten nut three full turns.

**SAFETY GOGGLES REQUIRED.**

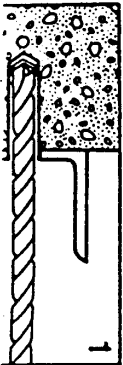
GLOBAL DISTRIBUTING, INC. - Example #1

# Sawko ANCHOR *with* QUALITY

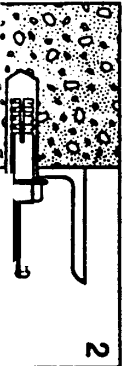


**TYPICAL APPLICATIONS:** Outlet Boxes • Stadium Seats • Steel Buildings • Wood Plates • Machine Locations • Parking Meters • Wall Hangers • Livestock Equipment • Belt Mountings • Distribution Pane • Bracing • Shelving • Baseboard Heating • Grain Bins

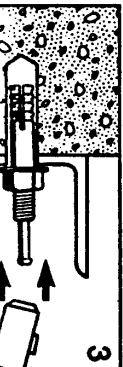
Drill hole to any depth exceeding minimum embedment using the All Drill Bit.



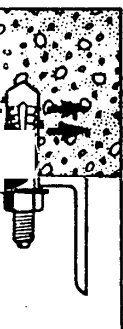
Preset the nut and washer for desired exposure.



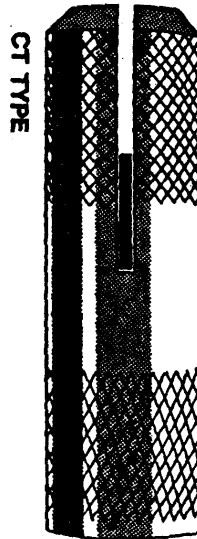
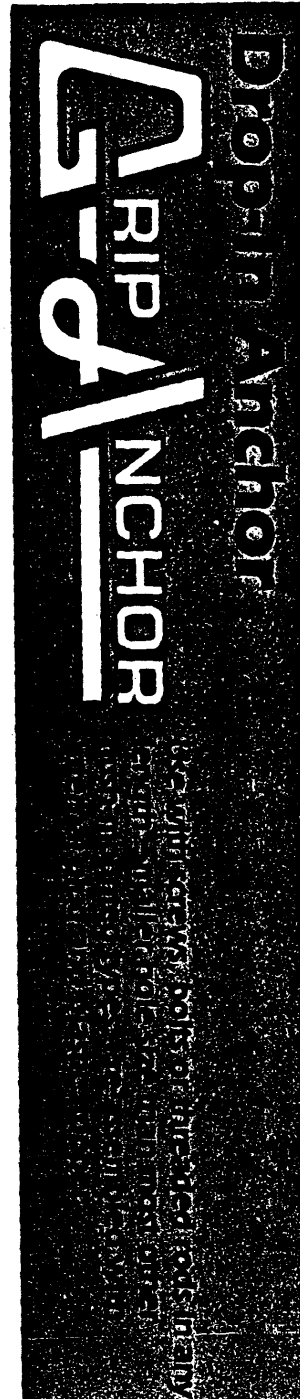
Drive pin flush with the top of All Anchor.



Slotted anchor base expands all four directions.



GLOBAL DISTRIBUTING, INC. - Example #2



**TYPICAL APPLICATIONS:** Curtain Walls • Wood Sleepers • Roof Flashings • Joists and Beam Hangers  
• Duct Straps • Pipe Run Supporters • Conduit Straps • Partitions • Signs

